THE RELATIONSHIP BETWEEN MENTAL ADJUSTMENT AND SCHOOL ACHIEVEMENT

A THESIS

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R.A.R.

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CHAPTER I

INTRODUCTION

Rationale.-- The school is important in the life of the child not only as an educative force but also and primarily as a tremendous influence in determining his ability to get along happily in the world. It should influence his mental health and promote better social understanding. When it accepts the responsibility of creating a healthy emotional climate, where there are good human relations between child and child, and child and teacher, then, and only then will we have conditions for good mental health.

Since the classroom teacher is rapidly becoming a guidance counselor for the children who spend on an average of six hours daily with her for nine months and since she has the major role in guiding them in their normal relationships in the home, the school, and the community, she can help lay the foundation for a well-rounded life. New insights into the dynamics of child behavior and personality must become an integral part of her philosophy if she is to be instrumental in the educative process. Since the emotional tone with which we live is often set for us in our school days, the classroom teacher should guide the children toward emotional security through affection and educational direction. The relationship between the teacher and the child is the most important factor for sound mental health.

If education for life is to become a meaningful concept, we shall need to investigate the social and emotional dynamics of behavior as well as the intellectual development of the child.

Academic achievement cannot stand alone. It must be coordinated with the physical, emotional, and social development of the child.

Since educators are accepting the fact that education concerns itself with the development of the total child, his mental, physical and emotional well-being, the writer's interest in developing this problem stems from her interest in keeping children mentally, physically and emotionally sound.

Statement of the Problem.-- The problem involved in this study is to determine the relationship between mental adjustment and school achievement of sixty seventh grade pupils enrolled in an urban Georgia Negro elementary school during the school term 1953-54.

Purposes of the Study.-- The purposes of the study are to answer the following questions:

1. What is the relationship, if any, between the girls' scores on the Mental Health Analysis Test and the Stanford Achievement Test?
2. What is the relationship, if any, between the girls' scores on the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test?
3. What is the relationship, if any, between the boys' scores on the Mental Health Analysis Test and the Stanford Achievement Test?
4. What is the relationship, if any, between the boys' scores on the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test?
5. Are there any significant differences between the "r's" obtained from the boys' scores and the girls' scores?
6. What is the relationship, if any, between the Mental Health

Analysis Test and the Gray-Votaw-Rogers Achievement Test for the total group?

7. What is the relationship, if any, between the Mental Health Analysis Test and the Stanford Achievement Test for the total group?

8. What is the difference, if any, between the "r's" obtained in the relationship between the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test and the Stanford Achievement Test for the total group?

9. What are the sex differences, if any, on the Gray-Votaw-Rogers Achievement Test, on the Stanford Achievement Test, and on the Mental Health Analysis Test?

Definition of Terms.-- "Mental Adjustment" as used in this study refers to the scores made by the subjects on the Mental Health Analysis Test by Thorpe, Clarke and Tiegs.[1]

"Mental Health" as defined by the authors is a combination of freedom from behavorial immaturity, emotional instability, feelings of inadequacy, physical defects and nervous manifestations and the possession of close personal relationships, inter-personal skills, social participation, satisfying work and recreation and adequate outlook and goals.

"Achievement" as used in this study refers to the scores made by the subjects on the Gray-Votaw-Rogers General Achievement Test and the Stanford Achievement Test.

Method of Research.-- The descriptive method of research was used

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[1] Louis P. Thorpe, Willis W. Clarke and Ernest W. Tiegs, Manual of Directions - Mental Health Analysis Elementary Series (Los Angeles, 1946), p. 3.

with special reference to the use of the standardized tests and statistical treatment of the test scores for collecting and interpreting the data required in conducting the research.

Description of Subjects.-- The subjects of the present study were selected by "random sampling" from the total population of the seventh grade of an urban Negro elementary school in Georgia. By shaking thoroughly the box containing the concealed names, selecting one, recording and replacing the drawn names in the box, each subject was given an equal chance of appearing in the sample selected. Thirty girls and thirty boys were selected ranging from the ages of eleven to fourteen years. (Mean C. A. for boys 12-10; Girls 12-7 and Total Group 12-8).

Materials Used.-- The following instruments were used in collecting the data for this study:

1. Mental Health Analysis Test - Elementary Series, 1946, by Louis P. Thorpe and Willis W. Clarke, Ernest W. Tiegs, Consultant.
2. The Gray-Votaw-Rogers General Achievement Test, 1948, Intermediate Test, by Hob Gray, David Votaw and J. Lloyd Rogers.
3. Stanford Achievement Test, 1953, Advanced Battery, Form J, by Truman L. Kelley, Richard Madden, Eric F. Gardner, Lewis Terman and Giles M. Ruch. (A copy of each of these tests is included in the Appendix).

Description of Instruments.-- The purposes of this study were achieved through administering the three standardized tests chosen to measure mental health and achievement. The Mental Health Analysis Test has been organized into two sections of five categories each. Section I is designed to ascertain the presence of mental health liabilities; Section II is similarly adapted to the detection of vital mental health assets. The

purpose of this test is to assist teachers, parents and advisors in (1) identifying the mental health difficulties, (2) understanding their significances and implications, and (3) suggesting means for eliminating such difficulties.[1]

The Gray-Votaw Rogers Achievement Test was used to measure achievement. It may also be given for diagnostic or supervisory purposes.[2]

The Stanford Achievement Test was also used to measure achievement. It is designed to measure the important knowledges, skills and understandings commonly accepted as desirable outcomes of the major branches of the elementary curriculum.[3]

The three above named tests were selected because of their simplicity of administration, scoring, and interpretation.

Procedure.-- The specific steps used to accomplish the purposes of this study were:

1. The Mental Health Analysis Test was administered to the boys and girls enrolled at a Negro urban school on Tuesday morning, January 12, 1954, between the hours of 9:30 and 10:30 A.M. There was no definite time limit on the test, so within this range of time all the subjects of this study had completed the test.
2. On Wednesday morning, January 13, 1954, the subjects of this study

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[1] Louis P. Thorpe, Willis W. Clarke and Ernest W. Tiegs, Manual of Directions - Mental Health Analysis Elementary Series, p. 2.

[2] Manual of Directions - Stanford Achievement Test Advanced Battery, Partial Form J, Kelley-Madden-Gardner-Terman-Ruch (New York, 1953), p. 1.

[3] Manual of Directions and Interpretations - Intermediate, Gray-Votaw-Rogers (Austin, Texas, 1948), p. 6.

were given the Gray-Votaw-Rogers General Achievement Test. This test was given in the same room. It differed from the preceding test in that it had time limits for each subject. The subjects began their test at 9:30 A.M. and were stopped at 10:07 A.M. This was the first sitting. Booklets were taken up.

The second sitting began at 10:25 A.M. Booklets were passed. The test began at 10:30 A.M. and stopped at 11:03 A.M.

3. On Thursday morning, January 14, 1954 at 9:15 A.M. the subjects of this study were reassembled for the purpose of completing the Gray-Votaw-Rogers General Achievement Test. This was the third sitting. The subjects began the test at 9:30 and stopped at 10:12 A.M. Booklets were closed and passed in.

   At 10:40 A.M. the subjects of this study were ready for the fourth and last sitting. The booklets were passed. The last test began at 10:45 A.M. and stopped at 11:13 A.M.

4. The Stanford Achievement Test had already been administered on Tuesday morning, October 6, 1953 by the teachers of the three seventh grades. Permission was granted to secure the records from the files and record the test scores of the subjects of this study.

5. All of the tests were administered under very satisfactory testing conditions. The instructions for the administration as given in the various manuals were followed very carefully. Adequate lighting, comfortable seating, adequate writing space, and freedom from outside disturbances were provided.

   The writer used an "Eterna" watch which contained a second hand for timing. The writer took the added precaution of writing down exact minutes when the signal to start and stop was given, where

time was a factor in the administering of the test.

6. The scores made by the subjects of this study on the tests listed above were correlated.

7. The data obtained in this study are tabulated, graphed, evaluated, interpreted and summarized in the paragraph which follows.

Survey of Literature.-- Although research presents many studies concerning mental adjustment and school achievement, there was no research found dealing with the relationship between mental adjustment and school achievement using a sample similar to the one used in the present study. However, literature of a similar nature presented in this section will furnish a background for a better understanding of the study.

The literature was reviewed and organized under the following headings:

1. School Improvement of Mental Health in the Classroom
2. Early Symptoms of Ill-Mental Health and Ways of Adjustment
3. Provisions Made for Improvement of Mental Health
4. Relationship between Mental Health and School Achievement

There is a growing recognition that the school is designed not only for academic achievement of the large masses of pupils for the future, but it also serves as a basic center for the fundamental training of adjusting them for society. The literature below was selected as representative of the first category.

According to Krugman,[1] the child's areas consist of the home, the school, the church, the street, the playground and the human beings in these institutions but the school seems to lend itself to a clearer

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[1] Morris Krugman, "The Psychologist in a Mental Hygiene Program," Understanding The Child, The National Committee for Mental Hygiene (New York, 1939), p. 20.

outline of his adjustment than do the others.

Driscoll writes:

> Educators who are interested primarily in academic achievement are realizing more clearly that they are not successful in obtaining the intellectual growth desired when other aspects of growth are ignored.[1]

The National Committee for Mental Hygiene further comments on this point:

> Because we are becoming aware that all of us live much more by our own feelings than by our intelligence, the task of stimulating the growth of healthy feelings in our children becomes the responsibility of primary importance to every school interested in education in its wider sense.[2]

The Twentieth Yearbook Committee writes:

> The first responsibility of schools is to provide a social and emotional environment for pupils which will not only void those things known to have undesirable effects but will provide experiences known to constitute for desirable emotional development.[3]

Alice and Lester Crow[4] are of the opinion that it is necessary for the child to experience emotional security, a feeling of self realization and recognition of satisfactory achievement in relation to peers which the school can do if it understands the child.

Mehl, Mills and Douglas[5] write: "School life is of great importance

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1 Gertrude Driscoll, How to Study the Behavior of Children (New York, 1941), p. 2.

2 National Committee for Mental Hygiene, Department of Child Guidance, Board of Education, Mental Hygiene in the Classroom (Newark, N. J., 1931), p. 450.

3 American Association of School Administration, Department of National Education Association, Health in Schools - Twentieth Yearbook (Washington, D. C., 1942), p. 133.

4 Alice Crow and Lester Crow. "Development of Mental Health in the School Child," Journal of Education, 72:235, No. IV (December, 1951).

5 Marie A. Mehl, et. al., Teaching in the Elementary School (New York, 1950), p. 8.

in determining the present and future mental health of the child."[1]

This idea was reiterated by Tyron[1] who writes: "When schools accept the responsibility of helping our children to integrate the feeling - doing - thinking aspects of living, then and only then, will we have the basic conditions for good mental health."

Representative of the second category is the classroom which serves as a laboratory in which there is at work an interplay of all the forces - the physical, mental and social. It is here that the teacher can guide the children through their perplexities if she is aware of the symptoms of mental-ill health.

Bernard[2] points out that: "The symptoms of ill-mental health include excessive jealousy, truancy and pupils who have good mental ability who not only fail to work up to their capacities, but also fail to achieve the minimum standards."

Rees[3] feels that if the sound principles of mental hygiene are followed in early life and continued by wiser education and clear thinking much serious mental breakdowns might be avoided.

The National Asscciation for Mental Hygiene writes:

> Mental health means the all over way that people get along - in their families, at school, on the job, at play with their associates, and in the communities. It has to do with the way each person harmonizes his desires, ambitions, ideals, feelings

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1 Caroline Tryon, "Some Conditions of Good Mental Health," Fostering Mental Health in Our Schools. Association for Supervision and Curriculum Development (Washington, D. C., 1950), pp. 8-9.

2 Harold W. Bernard, Mental Hygiene for Classroom Teachers (New York, 1952), p. 12.

3 J. R. Rees, The Health of the Mind (New York, 1951), pp. 13-16.

and his conscience in order to meet the demand of life as he has to face it.[1]

A similar view is expressed by Menninger who says:

> Your mental health depends on your relationships with other people; (2) your codes of behavior; (3) your sources of satisfaction; (4) your ways of obtaining security, and (5) the value of your goal in life.[2]

Witherington[3] goes farther and says that a mentally adjusted child enjoys his parents, enjoys playing and working, and finds pleasure in home life. He is agreeable with other children, finds pleasure in school and is independent.

Haines and Lindberg write: "Teachers have long been concerned with the problem of adjustment in the classroom."[4]

Thorman[5] stresses this statement and states farther that mental health is safeguarded by emphasizing cooperation rather than competition and judging the child's success by his own particular abilities.

Givens[6] estimates that one out of every twenty children in our schools today is destined to spend some time in a mental hospital. Prevention

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1 National Association for Mental Health, Mental Health 1, 2, 3 (New York, 1951).

2 William C. Menninger, Self-Understanding A First Step to Understanding Children (Chicago, 1951), pp. 41-42.

3 H. Carl Witherington, "The Relationship of Mental Health to Education," Educational Psychology (Atlanta, 1946), XV, 348.

4 Allyne Clayton Haines and Lucile Lindbert, "Mental Health in Classroom Living," Progressive Education (February, 1953), p. 114.

5 George Thorman, "Toward Mental Health," Public Affairs Committee (New York, 1950), pp. 15-21.

6 National Education Association, Proceedings of the Eighty-Seventh Annual Meeting (Washington, D. C., 1949), pp. 321-25.

depends on diagnosis of early symptoms.

Wickman[1] made an experimental study in a Cleveland school in order to get teachers' attitudes on children's behavior. He found that teachers were more concerned with the stubborn, disorderly, aggressive, irresponsible, untruthful and disobedient child.

If the child has been relatively successful in meeting problems of infancy and pre-school age, he reaches the age for primary education with a well developed sense of trust in love and affection of those about him and look forward to experiences with other people with confidence.[2]

There are many indications of the growing awareness of mental-ill health. Many provisions have been made for its improvement. The following has been selected for presentation as illustrative of the material falling under the third category.

Studies made of serious delinquents in reformatories and prisons indicate that the beginning symptoms started in early childhood. The same was found to be true of the studies made of those persons who were mentally ill in hospitals. The facts impressed workers in these fields of the importance of reaching the individual in early age.

Healy made a five-year study of 1,000 children passing through the Chicago Juvenile Courts and it resulted in giving him a clearer understanding of the different aspects of these problems. He learned that it

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1 E. K. Wickman, Children's Behavior and Teachers' Attitudes (New York, 1929).

2 Katherine Lenroot, Education's Part in Developing of Healthy Personality in Children and Youth," The Educational Forum, Vol. XVII (November, 1952), 30.

would be necessary to reach these children at even an earlier state than that of juvenile court, if constructive results are to be obtained.[1]

In San Francisco, 800 typical children were treated in accordance with needs, only four of them appeared in juvenile court.

St. Louis experienced some what same results when out of 1,969 students in special classes, only 3.3 per cent were committed to correction institutions.[2]

A significant step toward the achievement of better mental health for the nation as a whole was taken in the passage of the National Mental Health Act. The purpose of the Act was to grant aid for: 1) research relating to the cause, diagnosis, prevention and treatment; 2) training a mental health personnel; and 3) establishment and expansion of community mental services.[3]

Averill[4] writes: "The experts best qualified to act as advisers to the teacher concerning mental hygiene are the psychologist, the psychiatrist and the psychiatric social worker."

The Commission on Human Relations of Progressive Education Association produced a series of books for teachers and students and secured films from the Hollywood Production to be used for demonstration.[5]

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1 Clara Bassett, The School and Mental Health (New York, 1931), pp. 3-4.

2 Harold W. Bernard, Mental Hygiene For Classroom Teachers (New York, 1952), p. 17.

3 Henry Work, "For Better Mental Health," The Child, Unit Children's Bureau, Vol. XIV (September, 1949), 39-40.

4 L. A. Averill, The Hygiene of Instruction (Boston, 1928), p. 294.

5 Walter S. Monroe, Encyclopedia of Educational Research, Revised Edition (New York, 1950), p. 734

The fact that there are enormous variations among children in their innate intellectual capacity is known to all teachers. Some children, when faced with continued demands at school and at home for success in work which is quite beyond their mental capacity, react to the pressure upon them by delinquent behavior.[1] The following has been selected for presentation as illustrative of the material encountered which falls under the fourth category.

Rees[2] writes: "When a child goes to school, it is quite likely that his parents may demand a standard of work and conduct from him which is unduly high. This emphasis on results is extremely harmful."

Driscoll[3] feels that disturbances in the physical, social and emotional health limit ability to concentrate, to memorize, to reason logically or to respond to classroom stimulation.

Almy[4] writes: "Poor school achievement which results from emotional disturbances is often mistaken for lack of ability."

The above statements have been further stressed by Rock[5] as he writes: "A fundamental need of every individual is a feeling of achievement or accomplishment. No matter how limited his talents or abilities he must gain satisfaction from achieving as much as he is able to do."

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[1] Clara Bassett, op. cit., p. 21.

[2] J. R. Rees, The Health of the Mind (New York, 1951), p. 13.

[3] Gertrude Driscoll, How to Study the Behavior of Children (New York, 1941), p. 13.

[4] Millie Almy, "Improving the Mental Health of Children," Progressive Education, 30:105 (February, 1953).

[5] Robert T. Rock, Jr., "Personality Maladjustment and Mental Hygiene," Educational Psychology (New York, 1941), p. 605.

Thompson[1] feels that the child who is able to cope with outer pressures and inner drives in a way which is socially acceptable and gives him comforts is usually able to achieve up to his intellectual capacity in school.

Blos[2] further strengthens what has been said as he writes: "Knowledge can be applied fruitfully and with social responsibility when it operates in the human mind that is free from distorted emotions."

Work[3] further states that: "Those of us who deal with children find a high percentage of the research projects chosen that deal with disorders peculiar to the younger age group or the difficulties of children."

Rosenthal[4] made an experimental study on twenty-six Negro children matched with a group for social and intellectual status. He found that the mental health of the experimental group measured by the three instruments was improved and was in all probability due to something that went on in the classroom.

Gardberg[5] concluded that the zero or practically zero correlations in every case indicated a new responsibility that the school and community must assume in emotional education.

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1 Jean A. Thompson, "Well-Adjusted Children Learn Better," Department of Elementary School Principals Yearbook (1952), p. 162.

2 Peter Blos, "Mental Health in Teaching and Learning," Mental Hygiene (October, 1953), p. 555.

3 Henry H. Work, op. cit., p. 40.

4 Sheldon Rosenthal, "A Fifth Grade Classroom Experiment in Fostering Mental Health," Psychological Abstract, XXVII (New York, 1953), 395.

5 Naomi Gardberg, "A Test Survey of Mental Maturity, School Achievement and Mental Health and Personality Status in Grades Six, Seven and Eight." Unpublished Master's Thesis, Tulane University, 1949, p. 47.

Burke[1] found a very slight relationship between academic achievement and the personality factors.

Gough[2] found that there was no correlation between achievement and personality.

Oakley[3] found that total adjustment is closely related to total achievement. There is no significant difference in intelligence of boys and girls, but in achievement and total personality adjustment the girls excelled the boys.

Morgan[4] concluded that pupils who vary most in their school subjects are slightly more emotional; that girls are somewhat more emotional than boys.

Bush[5] found that withdrawing subjects are superior to aggressive subjects in achievement and in intelligence.

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1 William Tileston Burke, "A Quantitative Study Between the Components of the California Test of Personality and Achievement in Elementary Schools." Unpublished Master's thesis, University of Houston, 1949, p. 39.

2 Harrison G. Gough, "Factors Relating to Academic Achievement of High-School Students." University of Minnesota, 1949, Psychological Abstract, XL, 65-78.

3 Audolia Varness A. Oakley, "A Study of the Relationship Between Intelligence Personality Traits and Academic Achievement of Forty-five Eighth Grade Pupils of Toler High School, Granville County, North Carolina." Unpublished Master's thesis, Department of Education, Atlanta University, 1950, p. 62.

4 Marie Rose Morgan,"A Study of Relationships of Measures of Variability in School Subjects and Emotionality in Ninth Grade Pupils." Unpublished Master's thesis, Ohio University, 1940, p. 36.

5 Virginia Sherard Bush, "Differences in Intelligence and Achievement of Pupils Who Have Been Rated Aggressive and Withdrawing by Teachers." Unpublished Master's thesis, School of Education, Atlanta University, 1951, p. 45.

Dent[1] found that through non-school agencies and school agencies, delinquency, truancy, and other behavior problems could be met successfully.

Walker[2] found that problem children achieve at a much slower pace than non-problem children and that there is a positive correlation between intelligence and emotional stability.

Spinelle and Nemzek[3] found that intelligence quotients correlated to a fair degree with school achievement.

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1 Mary I. Dent, "Mental Hygiene for Primary Children," East Texas State Teachers College, 1940, pp. 22-23.

2 Margaret B. Walker,"A Comparative Study of Achievement Intelligence and Personality Traits of Thirty Problem and Thirty Non-Problem Children of the Sixth and Seventh Grades in Orange Street School, Fayetteville, North Carolina." Unpublished Master's thesis, Department of Education, Atlanta University, 1946, pp. 26-28.

3 Leo Spinelle and Claude L. Nemzek, "The Relationship of Personality Test Scores to School Marks and Intelligence Quotients," Journal of Social Psychology.

CHAPTER II

PRESENTATION AND INTERPRETATION OF DATA

General Description of Treatment of Data.-- Data resulting from the administration of the three instruments listed in the preceding chapter are presented in textual, tabular and graphic forms on the pages which follow. Interpretations of the data have been made possible by the use of statistics. Such interpretation will be presented in the light of the purposes of this study.

Performance of Subjects in Relationship to Norms.-- The mean score of the thirty male subjects in this study on the Gray-Votaw-Rogers General Achievement Test was 54.50 as compared with the test norm of 64.20. This revealed that the subjects in this study had an educational age of ten years and two months with an educational grade of 5.4 in terms of their performance on the test, while they are twelve years and seven months old chronologically, with an actual grade placement of 7.4. These subjects performed on the test as children in the fifth grade, ten years of age when they actually should have performed as children twelve years of age in the seventh grade. These subjects were retarded two grades.

The mean score of the thirty male subjects in this study on the Stanford Achievement Test was 51.60 as compared with the test norm of 53.00. These subjects had a grade placement of 5.6 in terms of their performance on the test, while the actual grade placement is 7.1. This revealed that these subjects performed as children in the fifth grade when they should have performed as children in the seventh grade. These subjects were retarded two grades.

The mean score for the thirty male subjects in this study on the Mental Health Analysis Test was 146.83. The fiftieth centile norm on the test was 147.00. This showed that these subjects were as mentally healthy as average individuals are in terms of the Mental Health Analysis Test.

The mean score of the thirty female subjects in this study on the Gray-Votaw-Rogers General Achievement Test was 54.00 with a test norm of 64.20. These subjects had an educational age of twelve years and eight months and an educational grade of 7.5 as shown by their performance on the test, while they are twelve years and seven months old chronologically, with a grade placement of 7.4. These subjects made the normal progress on the test for their grade level.

The mean score of the thirty female subjects in this study on the Stanford Achievement Test was 50.90 with a test norm of 51.50. These subjects had an educational grade placement of 5.4 as shown by their performance on the test while they actually have a grade placement of 7.1. Since these subjects were in the seventh grade and performed as though they were in the fifth grade, they were retarded two grades.

The mean score of the thirty female subjects in this study on the Mental Health Analysis Test was 153.17. The fiftieth centile norm of 147.00 on the test revealed that these subjects were as mentally healthy or perhaps more so than the average subjects in terms of the Mental Health Analysis Test.

The mean score for the total group of subjects in this study on the Gray-Votaw-Rogers General Achievement Test was 54.20, as compared with the test norm of 64.20. This showed that the total group of subjects in this study had an educational age of twelve years and eight months with an

educational grade placement of 7.5 in terms of their performance on the test, while they were twelve years and seven months old chronologically, with an actual grade placement of 7.4. This group of subjects performed as the average group of subjects would perform at their ages and grade level.

The mean score of the total group of subjects in this study on the Stanford Achievement Test was 51.25 as compared with the test norm of 52.00. This disclosed that this group of subjects had a grade placement of 5.5 in terms of their performance on the test, while the actual grade placement is 7.1. This revealed that this group of subjects performed as children in the fifth grade when they should have performed as children in the seventh grade. These subjects were retarded two grades.

The mean score of the total group of subjects in this study on the Mental Health Analysis Test was 150.00. The fiftieth centile norm on the test was 147.00. This indicates that these subjects were comparable to the average child in their mental adjustment.

The thirty female subjects were given the Gray-Votaw-Rogers General Achievement Test, the Stanford Achievement Test and the Mental Health Analysis Test. The mean score on the Gray-Votaw-Rogers General Achievement Test for the female subjects in this study was 54.00. Thirteen of the subjects attained scores above the mean while twelve scored below the mean. Nineteen subjects were found to lie within the limits of one sigma above the mean and one sigma below the mean. The standard deviation of the distribution was 7.26. There were 63 1/3 per cent of the cases lying within the limits of one sigma above and one sigma below the mean. There was little less clustering about the mean than would have been true if the

distribution had been normal. The range of the scores in the distribution was 27. The highest score was 65 and the lowest score was 38.

The mean score of the distribution for the thirty female subjects on the Stanford Achievement Test was 50.90. Fifteen of the female subjects attained scores above the mean while eleven scored below the mean. Twenty-three subjects were found to lie within the limits of one sigma above the mean and one sigma below the mean. The standard deviation was 8.10. There were 76 2/3 per cent of these cases lying within the limits one sigma above and one sigma below the mean. There was a greater clustering about the mean than would be if the distribution were normal. The range of the scores in the distribution was 34. The highest score was 67 and the lowest score 33.

The mean score of the distribution for the thirty female subjects on the Mental Health Analysis Test was 153.17 with a standard deviation of 14.75. Fifteen of the subjects attained scores above the mean while eleven scored below the mean. Twenty-three of the subjects were found to lie within the limits of one sigma above the mean and one sigma below the mean. There were 76 2/3 per cent of the cases lying one sigma above and one sigma below the mean. There was a greater clustering about the mean than would have been true if the distribution were normal. The range of the scores in the distribution was 72. The highest score was 184 and the lowest score was 112.

These data are presented in tabular and graphic forms in Table 1, and Figures 1, 2 and 3, pages 22,23 and 24, respectively.

TABLE 1

FREQUENCY DISTRIBUTION OF RAW SCORES ON THE THIRTY FEMALE SUBJECTS ON THE THREE TESTS

GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT		STANFORD ACHIEVEMENT		MENTAL HEALTH ANAYLSIS	
Scores	Frequency	Scores	Frequency	Scores	Frequency
65-67	1	67-69	1	180-184	1
62-64	5	64-66	2	175-179	0
59-61	5	61-63	0	170-174	1
56-58	2	58-60	2	165-169	6
53-55	5	55-57	4	160-164	5
50-52	4	52-54	6	155-159	2
47-49	3	49-51	4	150-154	4
44-46	1	46-48	4	145-149	1
41-43	2	43-45	3	140-144	5
38-40	2	42-44	0	135-139	2
35-37	0	37-39	0	130-134	3
32-34	0	34-36	1	125-129	0
29-31	0	31-33	1	120-124	0
				115-119	0
				110-114	1
Total	30	Total	30	Total	30
Mean	54.00	Mean	50.90	Mean	153.17
Standard Deviation	7.26	Standard Deviation	8.10	Standard Deviation	14.75

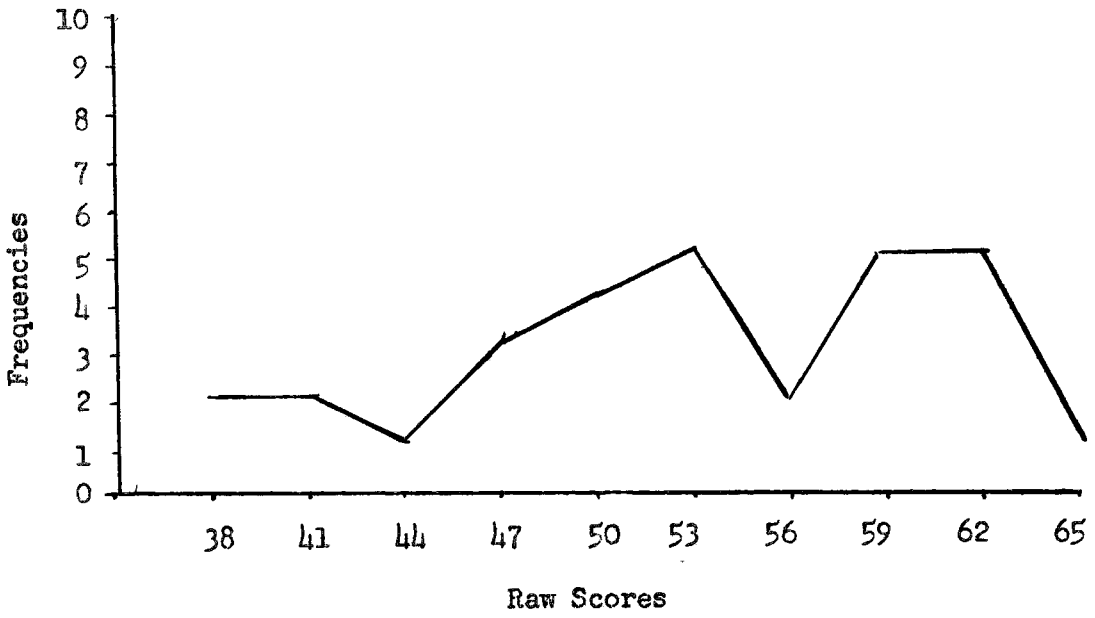

Fig. 1.- Frequency polygon of raw scores of thirty girls on the Gray-Votaw-Rogers General Achievement Test

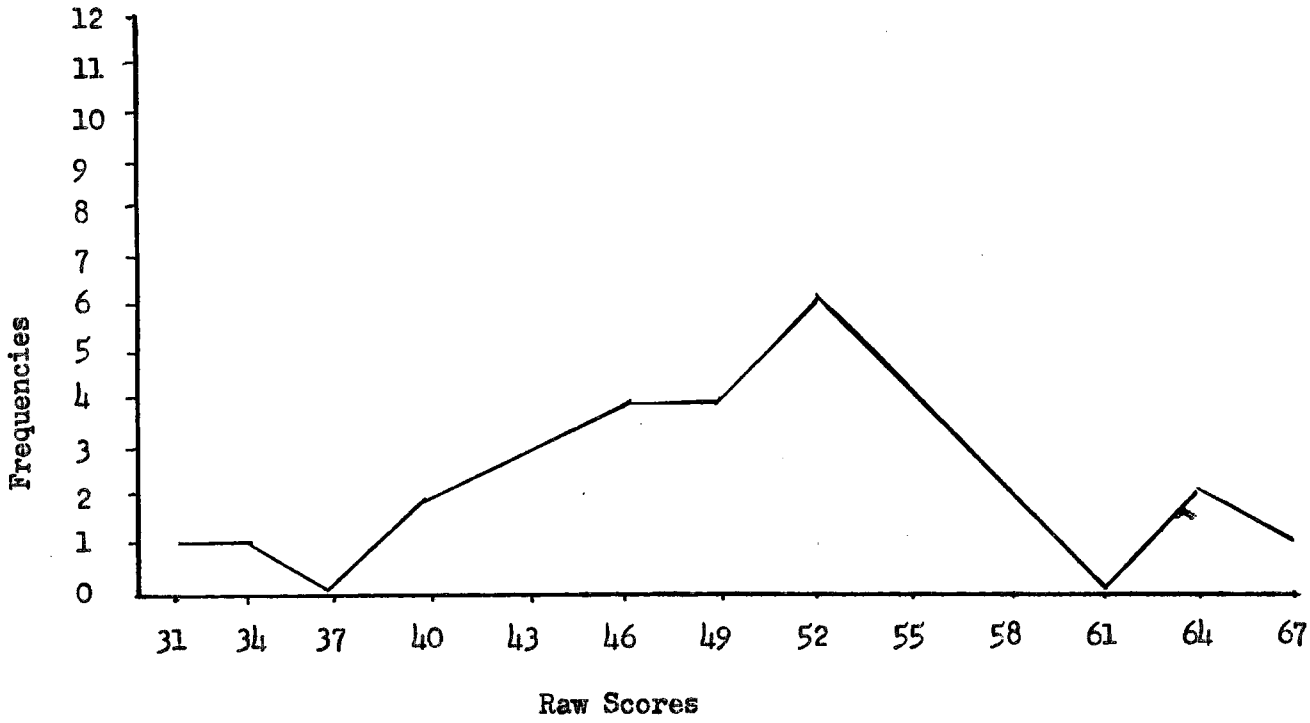

Fig. 2.- Frequency polygon of raw scores of thirty girls on the Stanford Achievement Test

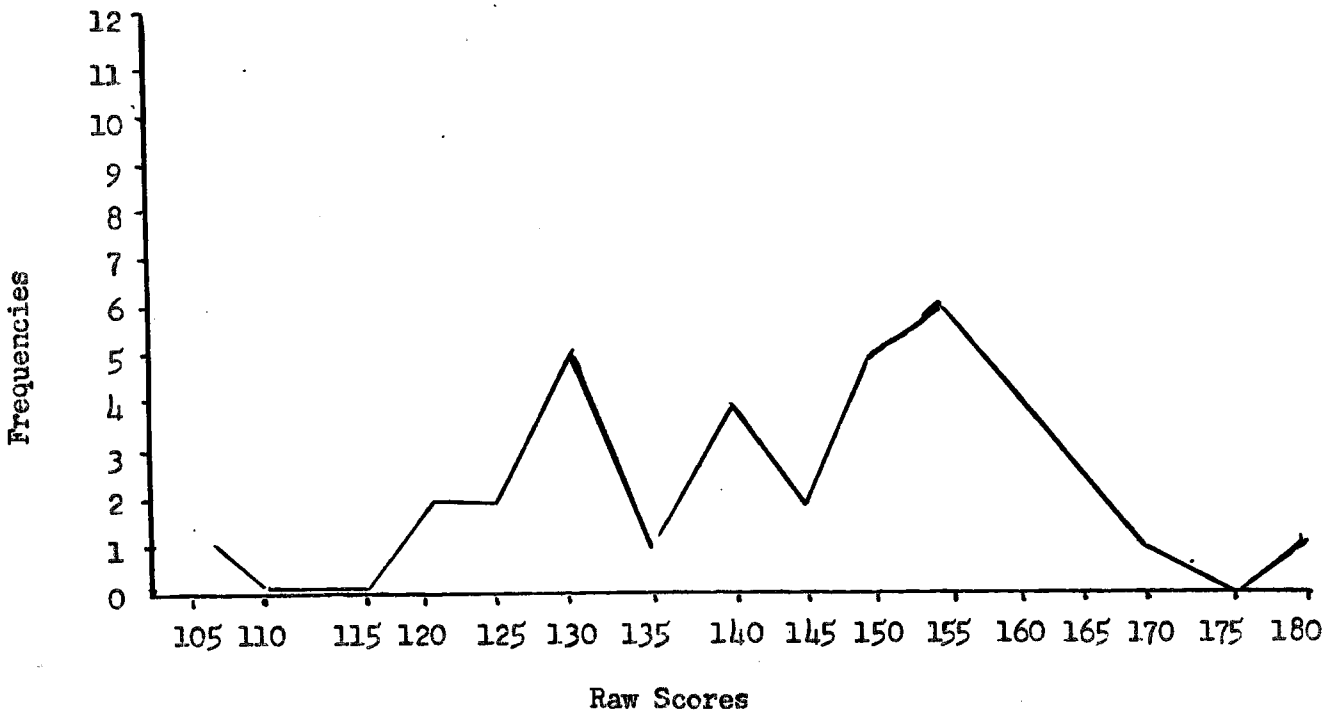

Fig. 3.- Frequency polygon of raw scores of thirty girls on the Mental Health Analysis Test

Following the same procedure initiated in the administration of the same three tests to the female subjects in this study, the male subjects had a mean score of 54.50 on the Gray-Votaw-Rogers General Achievement Test. Thirteen of the subjects scored above the mean while twelve achieved scores below the mean. Twenty-three subjects were found to lie within the limits of one sigma above and one sigma below the mean. The standard deviation of the distribution was 7.92. The percentage of cases lying within one sigma above and one sigma below the mean was 76 2/3 per cent. This indicated a greater clustering about the mean than would be true if the distribution were normal. The range of the scores in the distribution was 37. The highest score was 67 and the lowest score was 30.

The mean score of the thirty male subjects on the Stanford Achievement Test was 51.60. Thirteen of the male subjects scored above the mean and thirteen scored below the mean. Eighteen subjects were found lying within the limits one sigma above the mean and one sigma below the mean. The standard deviation of the distribution was 8.73. Within this range was 60 per cent of the distribution. This was below the normal range of 68.26. The range of scores in the distribution was 34. The highest score was 66 and the lowest was 32.

The mean score for the thirty male subjects on the Mental Health Analysis Test was 146.83 with a standard deviation of 17.75. Twelve of the subjects scored above the mean, while thirteen scored below the mean. Twenty-two subjects lie within the limits of one sigma above and one sigma below the mean. The percentage within this range was 73 1/3 indicating a greater clustering about the mean than would be the case if the distribution were normal. The range of scores in the distribution was 76, the highest score

was 182 and the lowest 106.

These data from the mental health and school achievement tests for the male subjects have been presented in tabular and graphical form in Table 2, and in Figures 4, 5 and 6, pages 27, 28 and 29, respectively.

TABLE 2

FREQUENCY DISTRIBUTION OF RAW SCORES OF THE THIRTY MALE SUBJECTS ON THE THREE TESTS

GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT		STANFORD ACHIEVEMENT		MENTAL HEALTH ANALYSIS	
Scores	Frequency	Scores	Frequency	Scores	Frequency
65-67	4	67-69	0	180-184	2
62-64	2	64-66	3	175-179	0
59-61	3	61-63	2	170-174	0
56-58	4	58-60	3	165-169	2
53-55	5	55-57	5	160-164	5
50-52	6	52-54	4	155-159	2
47-49	2	49-51	2	150-154	1
44-46	2	46-48	3	145-149	5
41-43	1	43-45	1	140-144	3
38-40	0	40-42	5	135-139	2
35-37	0	37-39	1	130-134	3
32-34	0	34-36	0	125-129	2
29-31	1	31-33	1	120-124	1
				115-119	1
				110-114	0
				105-109	1
Total	30	Total	30	Total	30
Mean	54.40	Mean	51.60	Mean	146.83
Standard Deviation	7.92	Standard Deviation	8.73	Standard Deviation	17.75

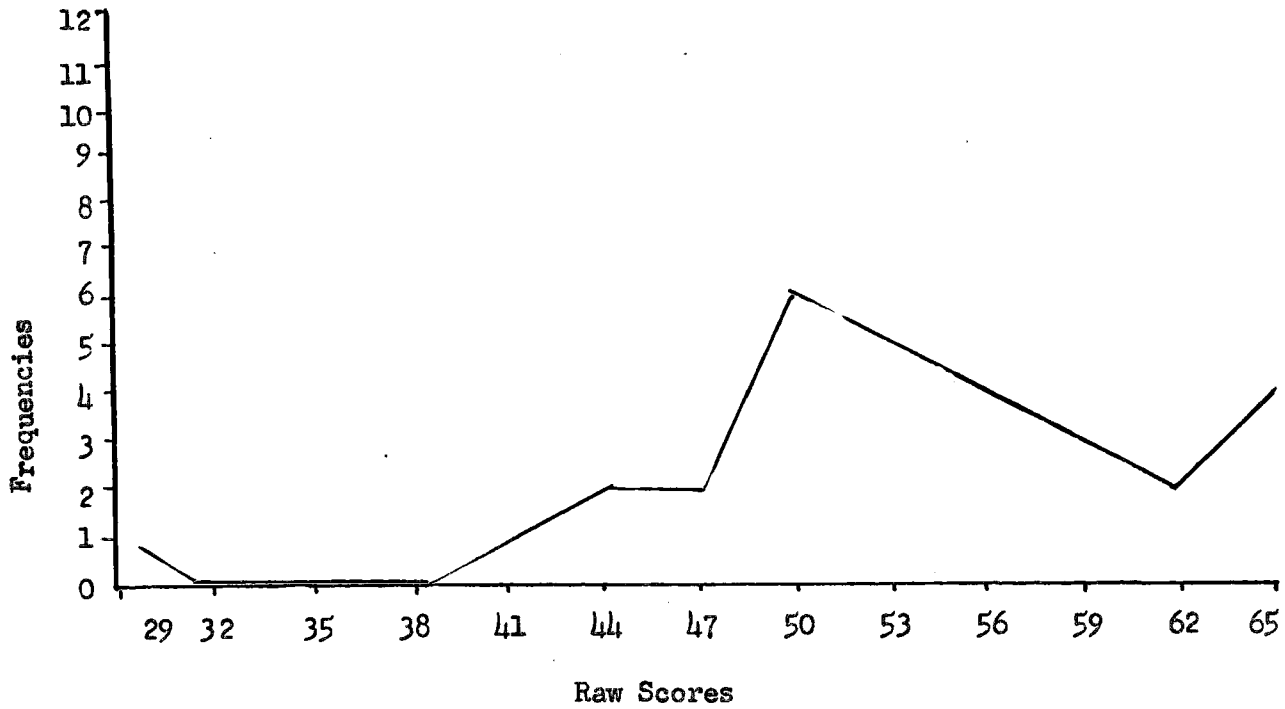

Fig. 4.- Frequency polygon of raw scores of thirty boys on the Gray-Votaw-Rogers General Achievement Test

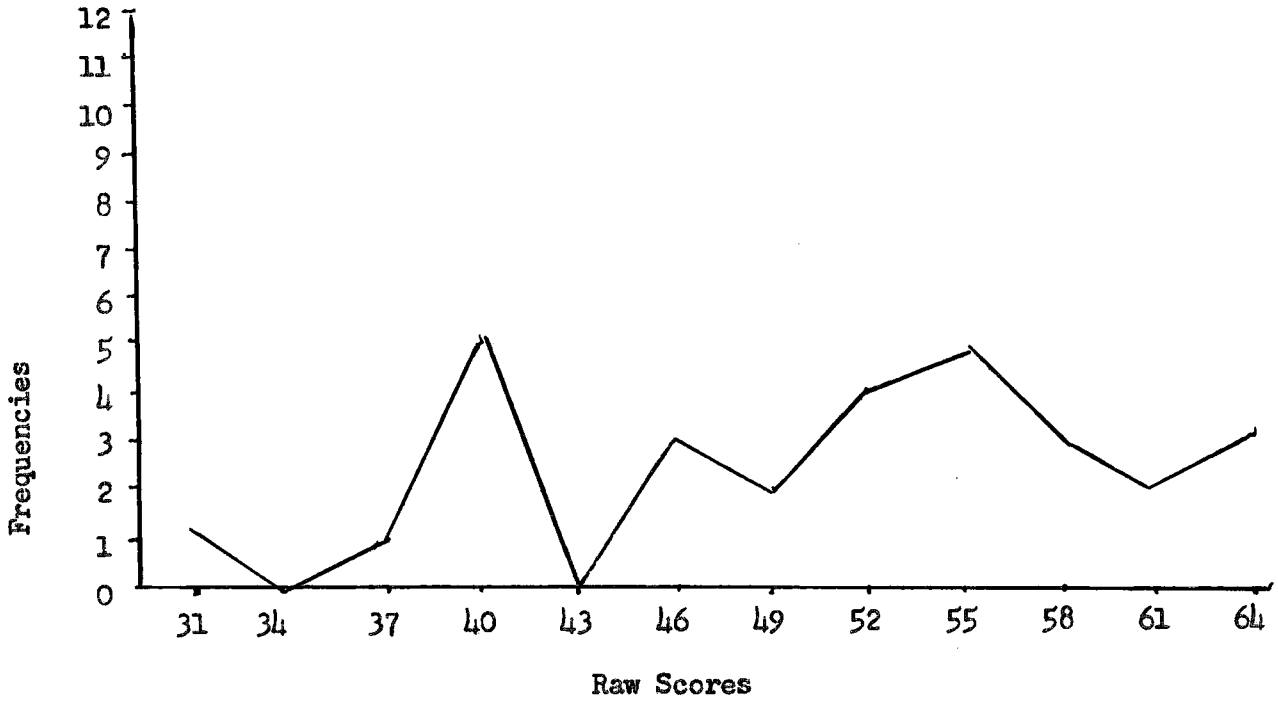

Fig. 5.- Frequency polygon of raw scores of thirty boys on the Stanford Achievement Test

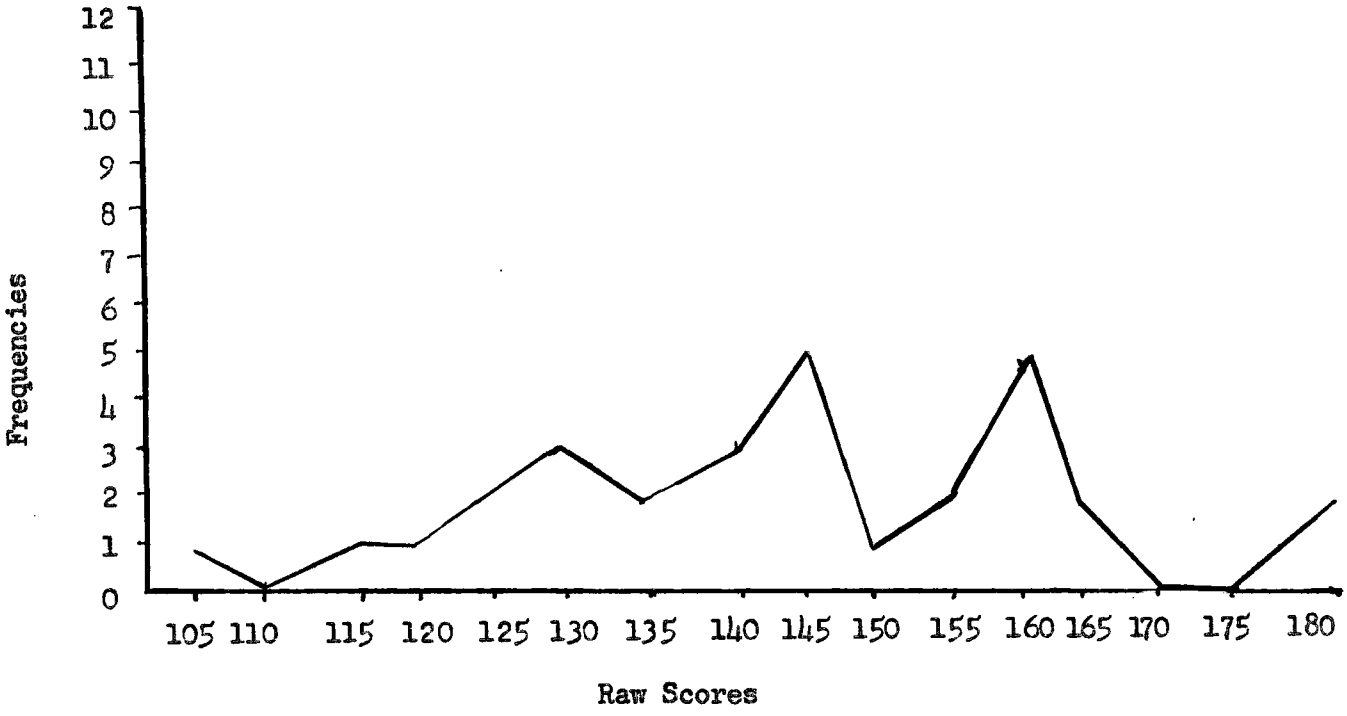

Fig. 6.- Frequency polygon of raw scores of thirty boys on the Mental Health Analysis Test

Sex Differences Between the Relationships Derived from the Boys' and Girls' Test Performances.— To find the relationship between mental health and school achievement, the Pearson-Product moment coefficient of correlation was computed between the mental health and school achievement on the Gray-Votaw-Rogers General Achievement Test. The female subjects yielded a coefficient of correlation of .37 with a standard error of .16. The "r" .37 was insignificant since it was less than three times the standard error .16. The coefficient of correlation registered by the male subjects on the same test was .64 with a standard error of .11. The "r" .64 was significant as it was more than three times its standard error. Mental health and school achievement are related in so far as the male subjects are concerned.

On the Stanford Achievement Test, the female subjects had a coefficient of correlation of .30 with a standard error of .17. The "r" .30 was insignificant since it was less than three times the standard error .17. A coefficient of correlation of .51 was yielded by the male subjects with a standard error of .11. The "r" .51 was significant since it was more than three times the standard error .11. In so far as the male subjects are concerned mental health and school achievement are related but the two variables are unrelated in so far as the female subjects are concerned.

To find if there were a significant difference between the "r's" for both sexes the coefficients of correlation were converted to "z's" and used in the "z" test of the difference between the "r's". The "r's" were converted into Fisher's z-function. On the test performance between mental health and school achievement on the Gray-Votaw-Rogers General Achievement Test the male subjects attained an "r" of .64 with a corresponding "z"

of .758. To establish the significance of the "z's" a "t" ratio was computed. A significance ratio of 2.78 was attained with an area under the normal curve of .4973 on the Gray-Votaw-Rogers General Achievement Test and the Mental Health Analysis Test. This significance ratio of 2.78 was significant beyond the 1 per cent level of confidence. A significance ratio of 2.06 was obtained on the Stanford Achievement Test and the Mental Health Analysis Test with an area under the normal curve of .4803. This significance ratio of 2.06 was also significant beyond the five per cent level of confidence. Both ratios indicate a significant difference between the relationships of mental health and school achievement in favor of the boys. Tables 3 and 4 present data concerning the relationship discussed in the preceding paragraphs and the differences between these relationships.

TABLE 3

COEFFICIENTS OF CORRELATION "r", AND STANDARD ERRORS OF "r" BETWEEN THE MENTAL HEALTH ANALYSIS TEST AND THE GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TESTS AND THE MENTAL HEALTH ANALYSIS TEST AND THE STANFORD ACHIEVEMENT TESTS

TESTS	COEFFICIENTS OF CORRELATION "r"		STANDARD ERRORS	
	Girls	Boys	Girls	Boys
Mental Health Analysis and Gray-Votaw-Rogers General Achievement	.37*	.64**	.16	.11
Mental Health Analysis and Stanford Achievement	.30*	.51**	.17	.11

** Significant Correlation

* Insignificant Correlation

TABLE 4

RELATIONSHIPS AND DIFFERENCES BETWEEN RELATIONSHIPS

Tests	Girls' "r"	Boys' "r"	Girls' "z"	Boys' "z"	d_z / $\sqrt{\frac{1}{N-3} + \frac{1}{N-3}}$	Significance Ratio	Area Under Normal Curve
Mental Health and Gray-Votaw-Rogers General Achievement	0	.64	0	.758	.273	2.78*	.4973
Mental Health Analysis and Stanford Achievement	0	.51	0	.563	.273	2.06*	.4803

*Significant difference in favor of boys

Test Performances of the Total Group.-- The mean score of the distribution for the total group in this study on the Gray-Votaw-Rogers General Achievement Test was 54.20. The standard deviation was 7.74. Twenty-six subjects achieved scores above the mean while twenty-four scored below the mean. Forty-six subjects were found to lie within the limits of one sigma above and one sigma below the mean. The percentage of cases within these limits was 76 2/3. This indicates a greater clustering about the mean than would be if the distribution were normal. The range of scores in the distribution was 37. The highest score was 67 and the lowest was 30.

The mean score of distribution for the total group on the Stanford Achievement Test was 51.25. The standard deviation was 8.31. Thirty-two subjects scored above the mean while twenty-one scored below the mean. Forty-one subjects were within the limits of one sigma above and one sigma below the mean. There were 68 1/3 per cent of the cases within these limits. This was a normal distribution. The range of scores in the distribution was 35. The highest score was 67 and the lowest was 32.

The mean score for the total group in this study on the Mental Health Analysis Test was 150.00. The standard deviation was 16.65. Twenty-six subjects scored above the mean while twenty-nine scored below the mean. Forty-six subjects were within the limits of one sigma above and one sigma below the mean. The percentage of cases within the limits was 76 2/3 per cent. This distribution shows a greater clustering about the mean than would be true if the distribution were a normal one. The range of scores in the distribution was 78. The highest score was 184 and the lowest was 106.

These data are presented in tabular and graphical form in Table 5, and Figures 7, 8 and 9, pages 35, 36 and 37, respectively.

TABLE 5

FREQUENCY DISTRIBUTIONS OF RAW SCORES OF THIRTY MALE AND THIRTY FEMALE SUBJECTS ON THE THREE TESTS

GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT		STANDARD ACHIEVEMENT		MENTAL HEALTH ANALYSIS	
Scores	Frequency	Scores	Frequency	Scores	Frequency
65-67	5	67-69	1	180-184	3
62-64	7	64-66	5	175-179	0
59-61	8	61-63	2	170-174	1
56-58	6	58-60	5	165-169	8
53-55	10	55-57	9	160-164	10
50-52	10	52-54	10	155-159	4
47-49	5	49-51	6	150-154	5
44-46	3	46-48	7	145-149	6
41-43	3	43-45	4	140-144	8
38-40	2	40-42	7	135-139	4
35-37	0	37-39	1	130-134	5
32-34	0	34-36	1	125-129	2
29-31	1	31-33	2	120-124	1
				115-119	1
				110-114	1
				105-109	1
Total	60	Total	60	Total	60
Mean	54.20	Mean	51.25	Mean	150.00
Standard Deviation	7.74	Standard Deviation	8.31	Standard Deviation	16.65

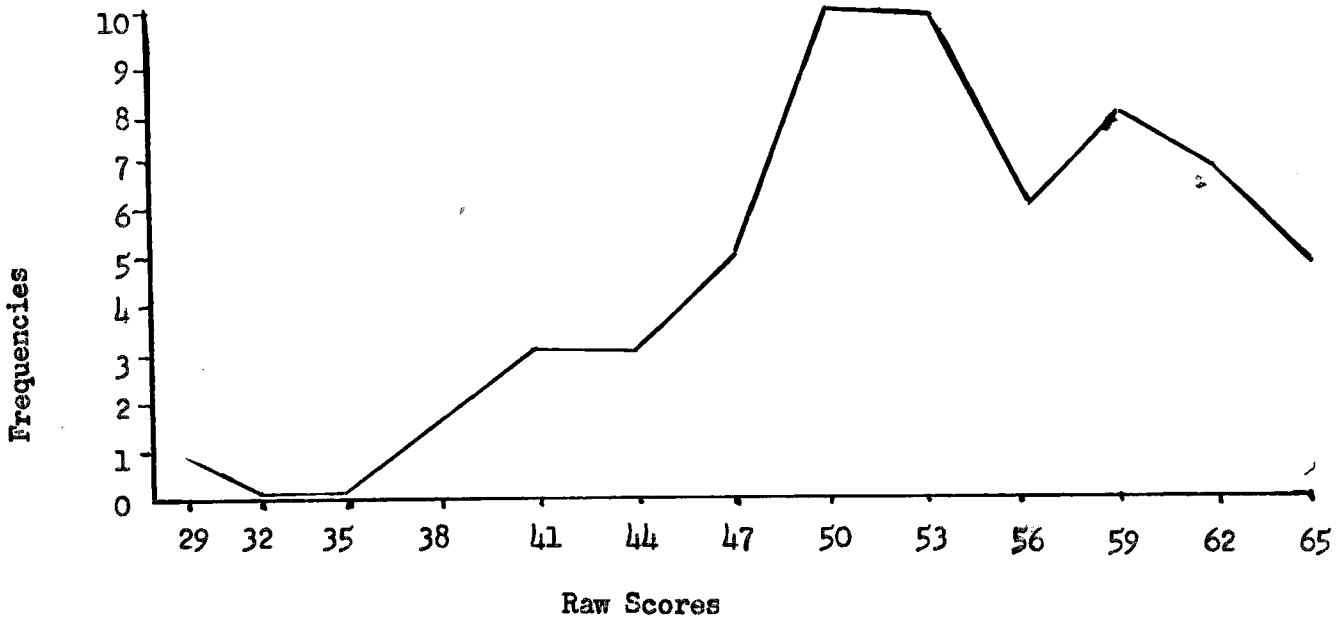

Fig. 7.- Frequency polygon of raw scores of sixty boys and girls on the Gray-Votaw-Rogers General Achievement Test

Fig. 8.- Frequency polygon of raw scores of sixty boys and girls on the Stanford Achievement Test

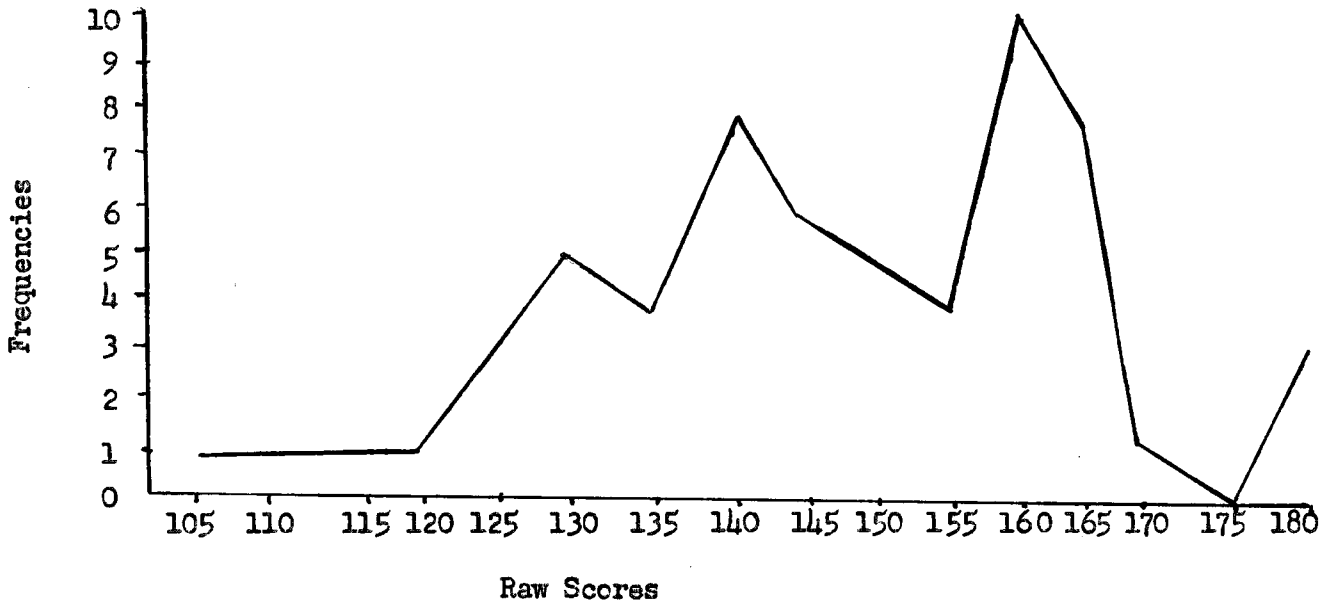

Fig. 9.- Frequency polygon of raw scores of sixty boys and girls on the Mental Health Analysis Test

Differences Between the Relationships Derived from the Results of the Two Different Tests of School Achievement and Mental Health Analysis Test.-- To find the relationship between mental health and school achievement for the total group of subjects in this study, the Pearson-product moment coefficient of correlation was computed between the variables. The coefficient of correlation was .51 with a standard error of .10 on the Gray-Votaw-Rogers General Achievement Test. This shows a significant relationship between mental health and school achievement since the coefficient of correlation .51 is more than three times the standard error .10. The coefficient of correlation on the Stanford Achievement Test by the total group was .38 with a standard error of .11. There was a significant relationship between mental health and school achievement as the coefficient of correlation .38 was more than three times the standard error .11.

Accurate measurements of a test determine its validity. But, when a test is measuring persons' behavior it is somewhat an inaccurate measurement because of the many errors that creep in when small samples are taken. So, the reliability coefficient shows the extent to which errors of measurement influence scores on a test.

Data are presented in Table 6 concerning the relationship between mental health and school achievement.

After finding the relationship between mental health and school achievement for the total group of subjects, the writer sought to determine the difference between the "r's". The coefficients were converted to "z's" and used in the "z" test of the difference between the "r's". The "r" .51 registered by the total group of subjects between mental health and the Gray-Votaw-Rogers General Achievement Test had a

TABLE 6

DATA CONCERNING THE COEFFICIENTS OF CORRELATION "r", AND STANDARD ERRORS BETWEEN THE MENTAL HEALTH ANALYSIS TEST AND THE GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TEST AND THE MENTAL HEALTH ANALYSIS TEST AND THE STANFORD ACHIEVEMENT TEST FROM RAW SCORES OF THE TOTAL GROUP

Tests	Coefficient of Correlation "r"	Standard Error
Mental Health Analysis and Gray-Votaw-Rogers General Achievement Test	.51*	.10
Mental Health Analysis and Stanford Achievement Test	.38*	.11

* Significant Relationship

corresponding "z" of .563. The total group of subjects registered an "r" of .38 with a corresponding "z" of .400, on the Stanford Achievement Test. To establish the significance of the difference between the "z's", a "t" ratio was computed. A significance ratio of 1.15 was obtained with an area under the normal curve of .3749. The significance ratio 1.15 is not significant at the 5 per cent level of confidence. Therefore it can be concluded that mental health is no more closely related to school achievement when the latter is measured by the Gray-Votaw-Rogers General Achievement Test than when it is measured by the Stanford Achievement Test. In both cases a significant "r" was attained, but one "r" is not significantly higher than the other.

Data are presented in Table 7 on the relationships and differences between relationships for the total group.

TABLE 7

RELATIONSHIPS AND DIFFERENCES BETWEEN RELATIONSHIPS FOR THE TOTAL GROUP

Tests	"r"	"Z"	Difference Between "z_s"	$\frac{d_{z1} = \cdot z_2}{\sqrt{\frac{1}{N-3} + \frac{1}{N-3}}}$	Significance Ratio	Area Under Normal Curve
Mental Health Analysis and Gray-Votaw-Rogers General Achievement	.51	.563	.163	.187	1.15*	.3749
Mental Health Analysis and Stanford Achievement	.38	.400				

* Insignificant difference

Comparison of Scores Achieved by the Thirty Boys and the Thirty Girls in Terms of Means, Standard Deviations, and Standard Error of the Means to Determine the Reliability of Differences Between the Means on the Three Tests.-- The ratio of difference to the standard error of difference for the mean scores of the total group on the Stanford Achievement Test was .32. On the Gray-Votaw-Rogers General Achievement Test the ratio of difference to the standard error of difference for the mean scores of the total group was .19. The ratio of difference to the standard error of difference for the total group on the Mental Health Analysis Test was 1.51. Each of the above ratios was insignificant and one may conclude that there are no sex differences on any of the tests as neither group was superior to the other. These data are presented in Table 8.

TABLE 8

COMPARATIVE SCORES IN TERMS OF MEANS, STANDARD DEVIATIONS AND STANDARD ERROR OF THE MEANS OF THIRTY BOYS AND THIRTY GIRLS TO DETERMINE THE RELIABILITY OF DIFFERENCES BETWEEN MEANS ON THE THREE TESTS

	Mean	Standard Deviation	Standard Error of Mean	Difference Between Means	Standard Error of Difference	Ratio of Difference to Standard Error of Difference	Significance of Difference
Boys	51.60	8.73	1.62	.70	2.21	.32	Insignificant
Girls	50.90	8.10	1.50				

GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TEST

	Mean	Standard Deviation	Standard Error of Mean	Difference Between Means	Standard Error of Difference	Ratio of Difference to Standard Error of Difference	Significance of Differences
Boys	54.40	7.92	1.47	.40	2.01	.19	Insignificant
Girls	54.00	7.26	1.35				

TABLE 8 (CONTINUED)

COMPARATIVE SCORES IN TERMS OF MEANS, STANDARD DEVIATIONS AND STANDARD ERROR OF THE MEANS OF THIRTY BOYS AND THIRTY GIRLS TO DETERMINE THE RELIABILITY OF DIFFERENCES BETWEEN MEANS ON THE THREE TESTS

MENTAL HEALTH ANALYSIS TEST

	Mean	Standard Deviation	Standard Error of Mean	Difference Between Means	Standard Error of Difference	Ratio of Difference to Standard Error of Difference	Significance of Differences
Boys	146.83	17.75	3.30	6.34	4.21	1.51	Insignificant
Girls	153.17	14.75	2.62				

CHAPTER III

SUMMARY OF FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Problem, Purpose, Subjects and Methodology.— This study has been concerned with the relationship between mental adjustment and school achievement. It was completed during the school year 1953-54.

The purpose of this study was to answer the following specific questions:

1. What is the relationship, if any, between the girls' scores on the Mental Health Analysis Test and the Stanford Achievement Test?
2. What is the relationship, if any, between the girls' scores on the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test?
3. What is the relationship, if any, between the boys' scores on the Mental Health Analysis Test and the Stanford Achievement Test?
4. What is the relationship, if any, between the boys' scores on the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test?
5. Are there any significant differences between the "r's" obtained from the boys' and the girls' scores?
6. What is the relationship, if any, between the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test for the total group?
7. What is the relationship, if any, between the Mental Health Analysis Test and the Stanford Achievement Test for the total group?
8. What is the difference, if any, between the "r's" obtained in the

relationship between the Mental Health Analysis Test and the Gray-Votaw-Rogers General Achievement Test for the total group?

9. What are the sex differences, if any, on the Gray-Votaw-Rogers General Achievement Test, on the Stanford Achievement Test, and on the Mental Health Analysis Test?

A total of sixty seventh grade pupils participated in this study. They were selected by "random sampling" from the total population of the seventh grade. Thirty of the subjects were girls and thirty were boys. The ages ranged from eleven to fourteen years.

In the collection and interpretation of the data for this study, the descriptive-survey method of research was used with the aid of certain statistical techniques. The tests listed below were employed in measuring the traits which were studied:

1. Mental Health Analysis Test - Elementary Series, 1946, by Louis P. Thorpe, Willis Clarke, and Ernest W. Tiegs, Consultant.
2. The Gray-Votaw-Rogers General Achievement Test, 1948, Intermediate, by Hob Gray, David Votaw and J. Lloyd Rogers.
3. Stanford Achievement Test, 1953, Advanced Battery, Partial Form J., by Truman I. Kelly, Richard Madden, Eric J. Gardner, Lewis M. Terman and Giles W. Ruch.

The data derived from the administration of the tests used in the study were tabulated, graphed, statistically treated, evaluated and interpreted with results reported in Chapter II.

The Pearson-product moment coefficient of correlation was used to determine the relationship between mental adjustment and school achievement. To determine the significance of the difference between the two "r's", both

were transformed into "z's", and the standard error of the difference between the two "z's" was obtained.

Summary of Literature.-- A review of the literature related in this study showed that the various authors who have studied the aspects of mental health as well as school achievement, seem to agree that the school should serve as a basic center for the training of the total child. It should be concerned with both psychological development and scholastic achievement since they are related psychologically, if not statistically.

They agree further that since the teacher is the key to healthy living at school, she has the obligation for developing her pupils physically, emotionally and socially.

Although statistically, the low coefficients of correlation between mental health and school achievement fail to predict that one variable is depended upon the other, the positive relationships reported in the literature indicate that there may be some social significance in the data. It may be well for teachers to be interested in mental health as it may have some relation to school achievement.

Summary of Findings.-- The analysis of the data collected in this study provides the following findings:

1. The relationship between mental health and school achievement on the Stanford Achievement Test was not significant as shown by the girls. The "r", .30, was not three times the standard error, .17.

2. The fact that "r", .37, was not three times the standard error, .16, showed that there was no significant relationship between mental health and school achievement on the Gray-Votaw-Rogers General Achievement Test as shown by the girls.

3. The relationship between mental health and school achievement on the Stanford Achievement Test was significant as shown by the boys since the "r", .51, was more than three times the standard error, .11.

4. The fact that the "r", .64, was more than three times the standard error, .11, showed that there was a significant relationship between mental health and school achievement on the Gray-Votaw-Rogers General Achievement Test as shown by the boys.

5. There was a significant difference between the "r's" obtained by the boys and the "r's" obtained by the girls in favor of the "r" derived from the test performances of the boys. The boys showed an "r" of .51 while the girls showed an "r" of zero. On the Stanford Achievement Test the significance ratio was 2.06. On the Gray-Votaw-Rogers General Achievement Test the boys showed an "r" of .64 while the girls showed an "r" of zero. The significance ratio was 2.78. Both of these significance ratios indicate reliable differences beyond the five per cent level of confidence.

6. The fact that the "r", .51, was more than three times the standard error, .10, showed that there was a significant relationship between mental health and school achievement as shown by the total group on the Gray-Votaw-Rogers General Achievement Test.

7. The "r", .38, was more than three times the standard error, .11. This showed that there was a significant relationship between mental health and school achievement on the Stanford Achievement Test as shown by the total group.

8. There was no significant difference between the "r's" as shown by the total group between mental health and school achievement on the Gray-Votaw-Rogers General Achievement Test and the Stanford Achievement Test.

The significance ratio 1.15 substantiates this statement.

The ratios of .32 on the Stanford Achievement Test, .19 on the Gray-Votaw-Rogers General Achievement Test and 1.51 on the Mental Health Analysis Test are insignificant and give supporting evidence that there are no sex differences on any of the tests.

Conclusions.-- The conclusions listed below are specific answers to the nine questions which were posed under the purposes of the study and are based wholly upon the data and findings of the present study.

1. There is no significant relationship between mental health as measured by the Mental Health Analysis Test and school achievement as shown by the girls on the Stanford Achievement Test.

2. There is no significant relationship between mental health as measured by the Mental Health Analysis Test and school achievement as shown by the girls on the Gray-Votaw-Rogers General Achievement Test.

3. There is a significant relationship between mental health as measured by the Mental Health Analysis Test and school achievement as shown by the boys on the Stanford Achievement Test.

4. There is a significant relationship between mental health as measured by the Mental Health Analysis Test and school achievement as shown by the boys on the Gray-Votaw-Rogers General Achievement Test.

5. There is a significant difference between the "r's" obtained by the boys and the "r's" obtained by the girls in favor of the boys between mental health as measured by the Mental Health Analysis Test and school achievement as measured by both the Gray-Votaw-Rogers General Achievement Test and the Stanford Achievement Test.

6. There is a significant relationship between mental health as measured

by the Mental Health Analysis Test and school achievement as shown by the total group on the Gray-Votaw-Rogers General Achievement Test.

7. There is a significant relationship between mental health as measured by the Mental Health Analysis Test and school achievement as shown by the total group on the Stanford Achievement Test.

8. There is no significant difference between the "r's" achieved between mental health as measured by the Mental Health Analysis Test and school achievement as measured by the two achievement tests when the total group was used.

9. There are no sex differences on any of the tests since neither sex group was superior to the other on any one of the three tests.

Implications.-- The classroom teacher needs to be more than a good teacher with good classroom methods. This is expressly so, when the comparable status of mental health and achievement enters the picture. She cannot hope for complete success in situations where poor social and emotional conditions exert extreme pressure on the child that he cannot cope with his unhappiness. In this case the learning process suffers and school achievement is sure to be affected. The child will more likely be successful in school if his mental adjustment needs are met. An awareness of these needs by the teacher and a willingness to try to meet them are essential if the school is going to be successful in preventing mental illness and difficulty in learning.

Teachers assume that mental adjustment and school achievement are closely related. But, in terms of the findings in this study, mental adjustment and school achievement were closely related in so far as the boys were concerned. The girls who yielded zero or practically zero correlations

showed that mental adjustment and school achievement do not appear to be statistically related.

The positive but low coefficients of correlation between the traits studied fail to predict that the variables are dependent, and offer evidence that the educators cannot hope to learn much about a pupil's school achievement by administering a mental adjustment test.

The coefficients of correlation for the thirty male subjects were significant and it seems logical to say that well adjusted boys may achieve with less difficulty than those who are inferior in their adjustment.

The coefficients of correlation for the thirty female subjects were not significant, so we may conclude that girls who are not mentally adjusted seem to achieve as well as those girls who are mentally adjusted. This does not appear, however, as sufficient reason for teachers to disregard the adjustment of girls.

Mental health is more closely associated with school achievement for the boys than for the girls so teachers might be more concerned with the boys who are doing poor work in school in terms of aiding them in efforts at personality adjustment.

Although all the coefficients of correlation were not significant, each case was positive. This seems to certainly show value in considering mental adjustment at the same time teachers are attempting to get their pupils to achieve maxiumally.

Recommendations.-- The writer's research in this field and the related literature leads the writer to feel warranted in making the following recommendations:

Since there seems to be a positive relationship between mental

adjustment of the pupils and their school achievement, it is important for teachers to know something about mental hygiene principles and how to implement them. Teachers should know something about the mental adjustment of their pupils so that they might know the possible effect of the pupil's mental adjustment on his school achievement.

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APPENDIX

Girls

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS STANFORD ACHIEVEMENT

			110–114	115–119	120–124	125–129	130–134	135–139	140–144	145–149	150–154	155–159	160–164	165–169	170–174	175–179	180–184					f	d	y'	y'²	+x'y'	−x'y'
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100		10				
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90		9				
	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80		8				
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70		7				
67–69	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6_1	12	18	24	30	36	42	48	54	60	1	6	6	36	6	
64–66	-50	-45	-40	-35	-30	-25	-20	-15	-10_1	-5		5	10	15	20	25	30	35	40	45	50	2	5	10	50	20	10
61–63	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4		4	8	12	16	20	24	28	32	36	40	—	4				
58–60	-30	-27	-24	-21	-18	-15	-12	-9	-6_1	-3		3	6	9	12	15	18	21	24	27	30	2	3	6	18	18	6
55–57	-20	-18	-16	-14	-12	-10	-8	-6	-4_1	-2		2_1	4_1	6	8	10	12	14	16	18	20	4	2	8	16	12	4
52–54	-10	-9	-8	-7	-6	-5	-4_1	-3_1	-2	-1_1	1	1	2 2_1	3	4	5	6	7	8	9	10	6	1	6	6	5	8
49–51									1				1									4					
46–48	10	9	8	7	6	5	4	3	2 2_1	1	1	-1	-2 -1_1	-3	-4	-5	-6	-7	-8	-9	-10	4	-1	-4	4	2	4
43–45	20	18	16	14	12	10	8	6 6_1	4	2	1	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	3	-2	-6	12	6	6
40–42	30	27	24 24_1	21	18	15	12	9	6	3		-3	-6 -6_1	-9	-12	-15	-18	-21	-24	-27	-30	2	-3	-6	18	24	6
37–39	40	36	32	28	24	20	16	12	8	4		-4	-8	-12	-16	-20	-24	-28	-32	-36	-40		-4				
34–36	50	45	40	35	30	25	20	15	10	5	1	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	1	-5	-5	25		
31–33	60	54	48	42	36	30	24 24_1	18	12	6		-6	-12	-18	-24	-30	-36	-42	-48	-54	-60	1	-6	-6	36	24	
	70	63	56	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70		-7				
	80	72	64	56	48	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80		-8				
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90		-9				
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100		-10				

																						Σf (N)	Σy'	Σy'²	Σ+x'y'	Σ−x'y'
f			1				2	2	5	1	4	2	5	6	1		1					30	9	221	117	−44
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	Σx'			Σx'y'	
x'			-8				-8	-6	-10	-1		2	10	18	4		6					7			73	
x'²			64				32	18	20	1		2	20	54	16		36					Σx² 263				

$$\frac{\Sigma x'}{N} = \frac{7}{30} = .23$$

$$\left(\frac{\Sigma x'}{N}\right)^2 = (.23)^2 = .05$$

$$\frac{\Sigma x'^2}{N} = \frac{263}{30} = 8.77$$

$$\frac{\Sigma y'}{N} = \frac{9}{30} = .30$$

$$\left(\frac{\Sigma y'}{N}\right)^2 = (.30)^2 = .09$$

$$\frac{\Sigma y'^2}{N} = \frac{221}{30} = 7.37$$

$$\frac{\Sigma x'y'}{N} = \frac{73}{30} = 2.43$$

$$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{8.77 - .05} = 2.95$$

$$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{7.37 - .09} = 2.70$$

$$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$$

$$= \frac{2.43 - (.23)(.30)}{}$$

$$= \boxed{.30}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.30)^2}{\sqrt{}}$$

$$= \frac{.91}{5.47} = .17$$

GIRLS

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS GENERAL ACHIEVEMENT (GRAY - VOTAW - ROGERS)

			110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184					f	d	y'	y'²	+x'y'	-x'y'
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100		10				
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90		9				
	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80		8				
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70		7				
	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6	12	18	24	30	36	42	48	54	60		6				
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5		5	10	15	20	25	30	35	40	45	50		5				
63-65	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4		4	8	12_{11}	16	20	24	28	32	36	40	2	4	8	32	24	
60-62	-30	-27	-24	-21	-18	-15	-12	-9_1	12_{11}	-3	1	6_{11}	6	9_1	12_1	15	18	21	24	27	30	8	3	24	72	27	21
57-59	-20	-18	-16	-14	-12	-10	-8	-6	4_1	-2		2	4	6_1	8	10	12_1	14	16	18	20	3	2	6	12	18	4
54-56	-10	-9	-8	-7	-6	-5	4_1	-3	-2	-1		1	2_1	3	4	5	6	7	8	9	10	2	1	2	2	2	4
51-53										1	11		11									5					
48-50	10	9	8	7	6	5	4	3	4_{11}	1		-1	-4_{11}	-3_1	-4	-5	-6	-7	-8	-9	-10	5	-1	-5	5	4	7
45-47	20	18	16	14	12	10	8	6	4	2		-2	-4	-6_1	-8	-10	-12	-14	-16	-18	-20	1	-2	-2	4		6
42-44	30	27	24_1	21	18	15	12_1	9	6	3		-3	-6	-9	-12	-15	-18	-21	-24	-27	-30	2	-3	-6	18	36	
39-41	40	36	32	28	24	20	16	12	8	4	1	-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	1	-4	-4	16		
36-38	50	45	40	35	30	25	20	15_1	10	5		-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	1	-5	-5	25	15	
	60	54	48	42	36	30	24	18	12	6		-6	-12	-18	-24	-30	-36	-42	-48	-54	-60		-6				
	70	63	56	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70		-7				
	80	72	64	56	48	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80		-8				
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90		-9				
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100		-10				

																						Σf (N)	Σy'	Σy'²	Σ+x'y'	Σ-x'y'
f			1				2	2	5	1	4	2	5	6	1		1					30	18	186	126	42
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	Σx'			Σx'y'	
x'			-8				-8	-6	-10	-1		2	10	18	4		6					7			84	
x'²			64				32	18	20	1		2	20	54	16		36					Σx² 263				

$$\frac{\Sigma x'}{N} = \frac{7}{30} = .23$$

$$\left(\frac{\Sigma x'}{N}\right)^2 = (.23)^2 = .05$$

$$\frac{\Sigma x'^2}{N} = \frac{263}{30} = 8.77$$

$$\frac{\Sigma y'}{N} = \frac{18}{30} = .60$$

$$\left(\frac{\Sigma y'}{N}\right)^2 = (.60)^2 = .36$$

$$\frac{\Sigma y'^2}{N} = \frac{186}{30} = 6.20$$

$$\frac{\Sigma x'y'}{N} = \frac{84}{30} = 2.80$$

$$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{8.77 - .05} = 2.95$$

$$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{6.20 - .36} = 2.42$$

$$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$$

$$= \frac{2.80 - (.23)(.60)}{2.95 \times 2.42}$$

$$= \boxed{.37}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.37)^2}{\sqrt{30}}$$

$$= \frac{.86}{5.47} = .16$$

BOYS

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS GENERAL ACHIEVEMENT (GRAY - VOTAW - ROGERS)

			105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184				f	d	y'	y'²	+x'y'	-x'y'
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100		10				
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90		9				
	-90	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80		8				
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70		7				
	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6	12	18	24	30	36	42	48	54	60		6				
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5		5	10	15	20	25	30	35	40	45	50		5				
65-67	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4	1	4	8	12 12_1	16 16_1	20	24	28 28_1	32	36	40	4	4	16	64	56	
62-64	-30	-27	-24	-21	-18	-15	-12	-9	-6	-3		3	6	9 9_1	12	15	18	21 21_1	24	27	30	2	3	6	18	30	
59-61	-20	-18	-16	-14	-12	-10	-8	-6	-4 -4_1	-2 -2_1		2	4	6	8 8_1	10	12	14	16	18	20	3	2	6	12	8	6
56-58	-10	-9	-8	-7	-6	-5	-4	-3 -6_{11}	-2	-1 -1_1		1	2 2_1	3	4	5	6	7	8	9	10	4	1	4	4	2	7
53-55									1	1	1	1		1								5					
50-52	10	9	8	7	6	5	4 8_{11}	3	2	1	1	-1	-2 -2_1	-3 -6_{11}	-4	-5	-6	-7	-8	-9	-10	6	-1	-6	6	8	8
42-49	20	18	16	14	12	10	8	6 6_1	4	2	1	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	2	-2	-4	8	6	
44-46	30	27	24 24_1	21	18	15	12	9	6	3	1	-3	-6	-9	-12	-15	-18	-21	-24	-27	-30	2	-3	-6	18	24	
41-43	40	36	32	28	24	20 20_1	16	12	8	4		-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	1	-4	-4	16	20	
38-40	50	45	40	35	30	25	20	15	10	5		-5	-10	-15	-20	-25	-30	-35	-40	-45	-50		-5				
35-37	60	54	48	42	36	30	24	18	12	6		-6	-12	-18	-24	-30	-36	-42	-48	-54	-60		-6				
32-34	70	63	56	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70		-7				
29-31	80	72	64	56	48 48_1	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80	1	-8	8	64	48	
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90		-9				
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100		-10				

																						Σf (N)	Σy'	Σy'²	Σ+xy	Σ-xy
r			1		1	1	2	3	2	3	5	1	2	5	2			2				30	4	210	202	21
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	Σx'			Σxy'	
x'			-8		-6	-5	-8	-9	-4	-3		1	4	15	8			14				-1			181	
x'²			64		36	25	32	27	8	3		1	8	45	32			98				Σx'² 379				

$\frac{\Sigma x'}{N} = \frac{-1}{30} = -.03$

$\left(\frac{\Sigma x'}{N}\right)^2 = (-.03)^2 = .0009$

$\frac{\Sigma x'^2}{N} = \frac{379}{30} = 12.63$

$\frac{\Sigma y'}{N} = \frac{4}{30} = .13$

$\left(\frac{\Sigma y'}{N}\right)^2 = (.13)^2 = .02$

$\frac{\Sigma y'^2}{N} = \frac{210}{30} = 7.00$

$\frac{\Sigma x'y'}{N} = \frac{181}{30} = 6.03$

$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{12.63 - .0009}$

$= 3.55$

$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{7.00 - .02}$

$= 2.64$

$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$

$= \frac{6.03 - (-.03)(.13)}{3.55 \times 2.64}$

$= .64$

$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.64)^2}{\sqrt{\quad}}$

$= \frac{.59}{5.47} = .11$

Boys

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS STANFORD ACHIEVEMENT

			105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184			
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90
	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70
	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6	12	18	24	30	36	42	48	54	60
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5		5	10	15	20	25	30	35	40	45	50
64-66	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4 4_1	1	4	8_1	12	16	20	24	28	32	36	40
61-63	-30	-27	-24	-21	-18	-15	-12	-9	-6	-3		3	6	9	12_1	15	18	21_1	24	27	30
58-60	-20	-18	-16	-14	-12	-10	-8	-6	-8_{11}	-2		2	4	6	8	10	12	14_1	16	18	20
55-57	-10	-9	-8	-7	-6	-5	-4	-3_1	-2	-1_1	1	1	2	6_{11}	4	5	6	7	8	9	10
52-54							1							11	1						
49-51	10	9	8	7	6	5	4	3_1	2	1_1		-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
46-48	20	18	16	14	12	10	8	6	4	2	1	-2_1	-4	-6_1	-8	-10	-12	-14	-16	-18	-20
43-45	30	27	24	21	18	15	12	9	6	3	1	-3	-6	-9	-12	-15	-18	-21	-24	-27	-30
40-42	40	36	32 32_1	28	24	20 20_1	16 16_1	12	8	4	1	-4	-8_1	-12	-16	-20	-24	-28	-32	-36	-40
37-39	50	45	40	35	30	25	20	15 15_1	10	5		-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
34-36	60	54	48	42	36	30	24	18	12	6		-6	-12	-18	-24	-30	-36	-42	-48	-54	-60
31-33	70	63	56 42_1	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70
	80	72	64	56	48	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100

	f	d	y'	y'²
		10		
		9		
		8		
		7		
		6		
		5		
64-66	3	4	12	48
61-63	2	3	6	18
58-60	3	2	6	12
55-57	5	1	5	5
52-54	4			
49-51	2	-1	-2	2
46-48	3	-2	-6	12
43-45	1	-3	-3	9
40-42	5	-4	-20	80
37-39	1	-5	-5	25
34-36		-6		
31-33	1	-7	-7	49
		-8		
		-9		
		-10		

	x'y' +	x'y' -
64-66	8	4
61-63	33	
58-60	14	8
55-57	6	4
52-54		
49-51	4	
46-48		8
43-45		
40-42	68	8
37-39	15	
34-36		
31-33	42	

f			1		1	1	2	3	2	3	5	1	2	5	2			2			
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10
x'			-8		-6	-5	-8	-9	-4	-3		1	4	15	8			14			
x'²			64		36	25	32	27	8	3		1	8	45	32			98			

Σf (N)	Σy'	Σy'²
30	-14	260

Σx'
-1

Σx'²
379

Σ+x'y'	Σ-x'y'
190	32

Σx'y'
158

$$\frac{\Sigma x'}{N} = \frac{-1}{30} = -.03$$

$$\left(\frac{\Sigma x'}{N}\right)^2 = (-.03)^2 = .0009$$

$$\frac{\Sigma x'^2}{N} = \frac{379}{30} = 12.63$$

$$\frac{\Sigma y'}{N} = \frac{-14}{30} = -.47$$

$$\left(\frac{\Sigma y'}{N}\right)^2 = (-.47)^2 = .22$$

$$\frac{\Sigma y'^2}{N} = \frac{260}{30} = 8.67$$

$$\frac{\Sigma x'y'}{N} = \frac{158}{30} = 5.27$$

$$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{12.63 - .0009}$$

$$= 3.55$$

$$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{8.67 - .22}$$

$$= 2.91$$

$$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$$

$$= \frac{5.27 - (-.03)(-.47)}{3.55 \times 2.91}$$

$$= \boxed{.51}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.51)^2}{\sqrt{30}}$$

$$= \frac{.74}{5.74} = .11$$

GROUP

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS GENERAL ACHIEVEMENT (GRAY-VOTAW-ROGERS)

		105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184					f	d	y'	y'²	+x'y'	−x'y'
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100		10				
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90		9				
	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80		8				
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70		7				
	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6	12	18	24	30	36	42	48	54	60		6				
	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5		5	10	15	20	25	30	35	40	45	50		5				
65-67	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4 $_1$		4	8 $_1$	12 $_{11}$	16	20	24 $_1$	28	32	36	40	5	4	20	80	56	4
62-64	-30	-27	-24	-21	-18	-15	-12	-9 $_1$	-6 $_1$	-3		3 $_1$	6 $_1$	9 $_{11}$	12	15	18 $_1$	21	24	27	30	7	3	21	63	45	15
59-61	-20	-18	-16	-14	-12	-10	-8	-6 $_1$	-4 $_{11}$	-2	1	2 $_1$	4	6 $_1$	8 $_1$	10	12 $_1$	14	16	18	20	8	2	16	32	28	14
56-58	-10	-9	-8	-7	-6	-5	-4 $_{11}$	-3	-2 $_{11}$	-1		1 $_1$	2	3 $_1$	4	5	6	7	8	9	10	6	1	6	6	4	12
53-55							1	1	1	1	11		1111									10		0	0		
50-52	10	9	8	7	6	5 $_{11}$	4	3	2 $_1$	1 $_{11}$	1	-1 $_1$	-2 $_{11}$	-3 $_1$	-4	-5	-6	-7	-8	-9	-10	10	-1	-10	10	14	8
47-49	20	18	16	14	12	10	8 $_1$	6	4 $_1$	2 $_1$		-2	-4 $_{11}$	-6	-8	-10	-12	-14	-16	-18	-20	5	-2	-10	20	14	8
44-46	30	27 $_1$	24	21	18	15	12	9	6	3 $_1$		-3	-6	-9 $_1$	-12	-15	-18	-21	-24	-27	-30	3	-3	-9	27	30	9
41-43	40	36	32 $_1$	28	24 $_1$	20	16 $_1$	12	8	4		-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	3	-4	-12	48	72	
38-40	50	45	40	35	30	25	20	15 $_1$	10	5	1	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	2	-5	-10	50	15	
35-37	60	54	48	42	36	30	24	18	12	6		-6	-12	-18	-24	-30	-36	-42	-48	-54	-60	0	-6	0	0		
32-34	70	63	56	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70	0	-7	0	0		
29-31	80	72	64	56 $_1$	48	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80	1	-8	-8	64	56	
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90		-9				
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100		-10				

																						Σf (N)	Σy'	Σy'²	Σ+x'y'	Σ−x'y'
f		1	1	1	1	2	5	4	8	6	5	4	10	8	1	0	3					60	4	400	334	70
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	Σx'				
x'		-9	-8	-7	-6	-10	-20	-12	-16	-6		4	20	24	4		18					24			Σxy'	
x'²		81	64	49	36	50	80	36	32	6		4	40	72	16		108					Σx'² 874			264	

$$\frac{\Sigma x'}{N} = \frac{24}{60} = .40$$

$$\left(\frac{\Sigma x'}{N}\right)^2 = (.40)^2 = .16$$

$$\frac{\Sigma x'^2}{N} = \frac{674}{60} = 11.23$$

$$\frac{\Sigma y'}{N} = \frac{4}{60} = .07$$

$$\left(\frac{\Sigma y'}{N}\right)^2 = (.07)^2 = .0049$$

$$\frac{\Sigma y'^2}{N} = \frac{400}{60} = 6.67$$

$$\frac{\Sigma x'y'}{N} = \frac{264}{60} = 4.4$$

$$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{11.23 - .16} = 3.33$$

$$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{6.67 - .0049} = 2.58$$

$$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$$

$$= \frac{4.4 \;\; -(.40)(.07)}{3.33 \times 2.58}$$

$$= \boxed{.51}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.51)^2}{\sqrt{60}}$$

$$= \frac{.74}{7.75} = .10$$

GROUP

CORRELATION CHART FOR COMPUTATION OF PEARSON PRODUCT-MOMENT COEFFICIENT OF CORRELATION

X SCALE REPRESENTS MENTAL HEALTH ANALYSIS

Y SCALE REPRESENTS STANFORD ACHIEVEMENT

		105–109	110–114	115–119	120–124	125–129	130–134	135–139	140–144	145–149	150–154	155–159	160–164	165–169	170–174	175–179	180–184					f	d	y'	y'²	+y'	−y'
	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10		10	20	30	40	50	60	70	80	90	100		10				
	-90	-81	-72	-63	-54	-45	-36	-27	-18	-9		9	18	27	36	45	54	63	72	81	90		9				
	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8		8	16	24	32	40	48	56	64	72	80		8				
	-70	-63	-56	-49	-42	-35	-28	-21	-14	-7		7	14	21	28	35	42	49	56	63	70		7				
	-60	-54	-48	-42	-36	-30	-24	-18	-12	-6		6	12	18	24	30	36	42	48	54	60		6				
65-67	-50	-45	-40	-35	-30	-25	-20	-15	-10 -20_{11}	-5		5 10_{11}	10	15	20	25	30	35	40	45	50	5	5	+25	125	10	25
62-64	-40	-36	-32	-28	-24	-20	-16	-12	-8	-4		4	8	12_1	16_1	20	24_1	28	32	36	40	3	4	+12	48	52	
59-61	-30	-27	-24	-21	-18	-15	-12	-9_1	-6	-3		3	6	9	12	15	18_1	21	24	27	30	2	3	+6	18	18	9
56-58	-20	-18	-16	-14	-12	-10	-8_1	-6_1	-4_1	-2		2_1	4_1	6	8	10	12_1	14	16	18	20	6	2	+12	24	18	18
53-55	-10	-9	-8	-7	-6	-5_1	-4_1	-3_1	-4_{11}	-1_1		1	10^{2}_{11111}	6^{3}_{11}	4	5	6	7	8	9	10	13	1	+13	13	16	17
50-52									1	1	1		1	11								6		0			
47-49	10	9	8	7	6	5	4 4_1	3	2 4_{11}	1	1	-1	-2 -4_{11}	-3 -6_{11}	-4	-5	-6	-7	-8	-9	-10	8	-1	-8	8	8	10
44-46	20	18	16	14	12	10	8	6 6_1	4	2 4_{11}	11	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	5	-2	-10	20	10	
41-43	30	27 27_1	24 24_1	21	18 18_1	15 15_1	12	9	6	3 3_1		-3 -3_1	-6 -6_1	-9 -9_1	-12	-15	-18	-21	-24	-27	-30	8	-3	-24	72	87	18
38-40	40	36	32	28	24	20	16	12	8	4		-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	0	-4	—	—		
35-37	50	45	40	35	30	25	20 20_1	15	10	5		-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	1	-5	-5	25	20	
32-34	60	54	48	42 42_1	36	30	24 24_1	18	12	6	1	-6	-12	-18	-24	-30	-36	-42	-48	-54	-60	3	-6	-18	108	66	
	70	63	56	49	42	35	28	21	14	7		-7	-14	-21	-28	-35	-42	-49	-56	-63	-70		-7				
	80	72	64	56	48	40	32	24	16	8		-8	-16	-24	-32	-40	-48	-56	-64	-72	-80		-8				
	90	81	72	63	54	45	36	27	18	9		-9	-18	-27	-36	-45	-54	-63	-72	-81	-90		-9				
	100	90	80	70	60	50	40	30	20	10		-10	-20	-30	-40	-50	-60	-70	-80	-90	-100		-10				

																						Σf (N)	Σy'	Σy'²	Σ+xy	Σ−xy
f		1	1	1	1	2	5	4	8	6	5	4	10	8	1	0	3					60	3	461	305	97
d	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	Σx'			Σxy'	
x'		-9	-8	-7	-6	-10	-20	-12	-16	-6		4	20	24	4	0	18					-24			208	
x'²		81	64	49	36	50	80	36	32	6		4	40	72	16		108					Σx'² 674				

$$\frac{\Sigma x'}{N} = \frac{-24}{60} = -.40$$

$$\left(\frac{\Sigma x'}{N}\right)^2 = (-.40)^2 = .16$$

$$\frac{\Sigma x'^2}{N} = \frac{674}{60} = 11.23$$

$$\frac{\Sigma y'}{N} = \frac{3}{60} = .05$$

$$\left(\frac{\Sigma y'}{N}\right)^2 = (.05)^2 = .0025$$

$$\frac{\Sigma y'^2}{N} = \frac{461}{60} = 7.68$$

$$\frac{\Sigma x'y'}{N} = \frac{208}{60} = 3.47$$

$$\sigma_x = \sqrt{\frac{\Sigma x'^2}{N} - \left(\frac{\Sigma x'}{N}\right)^2} = \sqrt{11.23 - .16}$$

$$= 3.33$$

$$\sigma_y = \sqrt{\frac{\Sigma y'^2}{N} - \left(\frac{\Sigma y'}{N}\right)^2} = \sqrt{7.68 - .0025}$$

$$= 2.77$$

$$r = \frac{\frac{\Sigma x'y'}{N} - \left(\frac{\Sigma x'}{N}\right)\left(\frac{\Sigma y'}{N}\right)}{\sigma_x \cdot \sigma_y}$$

$$= \frac{3.47 - (-.40)(.05)}{3.33 \times 2.77}$$

$$= \boxed{.38}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N}} = \frac{1 - (.38)^2}{\sqrt{\ }}$$

$$= \frac{.86}{7.75} = .11$$

MENTAL HEALTH ANALYSIS—Elementary Series, Form A

Devised by Louis P. Thorpe and Willis W. Clark
Ernest W. Tiegs, Consultant

Do not write on this booklet unless told to do so by the examiner.

Directions:

If you are to use a special answer sheet, the method of answering questions is explained on the answer sheet. If you are to mark your answer on this booklet, the questions will be answered by making a circle around the **YES** or **NO**. Do the following examples:

A. Have you ever been to a moving picture theater? **YES NO**

B. Are you less than ten years of age? **YES NO**

On the following pages are more questions. On some of them you will make a circle around **YES**, and on others you will make a circle around **NO**. When told to begin you are to go right on from one page to another until you have finished them all.

Name.....**Sex: Boy—Girl**

School.....**Age**.....**Birthday**.....

Teacher.....**Grade**.....**Date**.....

	Score	Percentile	PERCENTILE RANK (Chart percentile rank here) 1 5 10 20 30 40 50 60 70 80 90 95 99
1. Lib.	____	____	
A. Beh. Im. . . . . (l)	____	____	
B. Em. Ins. (Freedom from) . . . . (m)	____	____	
C. Fl. Ina. (Freedom from) . . . . . (n)	____	____	
D. Ph. Def. (Freedom from) . . . . . (o)	____	____	
E. Ner. Man. (Freedom from) . . . . (p)	____	____	
2. Ast.	____	____	1 5 10 20 30 40 50 60 70 80 90 95 99
A. Cl. Per. Rel. . . . . (a)	____	____	
B. Intp. Sk. . . . . (b)	____	____	
C. Soc. Par. . . . . (c)	____	____	
D. Sat. W. and R. . . . (d)	____	____	
E. Ot. and Gls. . . . . (e)	____	____	
Total Score	____	____	1 5 10 20 30 40 50 60 70 80 90 95 99

PERCENTILE

1. Do your folks usually let you have some of the friends you want? YES NO a

2. Do you sometimes have a good talk with one or more of your teachers? YES NO a

3. Are you usually able to get the best seat at a program or other meeting? YES NO l

4. Do you often start eating before the others because they make you wait too long? YES NO l

5. Do your friends seem to think that you are going to get along well? YES NO a

6. Do people seem to hurt your feelings more often than they do the feelings of others? YES NO m

7. Are things often so bad that you feel as though life is hardly worth living? YES NO m

8. Are you often worried about things without knowing why? YES NO m

9. Do you know how to keep people from feeling bad when they make a mistake? YES NO b

10. Do you keep from showing that you are bothered when you lose at games? YES NO b

11. Are people often so unfair to you that you have to make a good many excuses? YES NO n

12. Do you like to be with others rather than to be alone? YES NO c

13. Do people seem to think you do your share when there is work to be done? YES NO c

14. Have you found it hard to make friends with the people you like? YES NO n

15. Do you usually try to work or play with your friends? YES NO e

16. Are most of your school subjects interesting? YES NO d

17. Do you worry because your legs are too large or too small? YES NO o

18. Are you troubled because your chin does not look right? YES NO o

19. Are you unhappy because people notice that you have a scar or marks on your face? YES NO o

20. Do you spend more time than you need to on your school work? YES NO d

21. Do you believe that all people should be treated right? YES NO e

22. Do you believe that working people are just as good as those who have lots of money? YES NO e

23. Do you have a hard time going to sleep? YES NO p

24. Do you believe that people who do the right things will usually win out? YES NO e

25. Do you often bite your fingernails? YES NO p

26. Have you found that it pays to make a fuss when people try to stop you from doing the things you like? YES NO l

27. Do some boys or girls get into your way so much that you push them aside? YES NO l

28. Does your family sometimes go to picnics or other places with you? YES NO a

29. Do you have some good friends of your own age? YES NO a

30. Do you have a very good friend who will talk with you about your troubles? YES NO a

31. Do you often feel as though something keeps you from doing things that you would like to do? YES NO m

32. Do you usually try to find out what your friends like to do? YES NO b

33. Do you usually tell people when they do something well? YES NO b

34. Do you often become so lost in your thoughts that you fail to notice the people around you? YES NO m

35. Are you more contented when you are alone than when you are with other people? YES NO m

36. Are you a member of a group that often does interesting things? YES NO c

37. Do you usually have your best times with boys or girls who are younger than you? YES NO n

38. Do you like to play games in the homes of your friends? YES NO c

39. Do you take part in plays or programs at school? YES NO c

40. Have you found that most pupils seem to get along in school better than you do? YES NO n

41. Do you feel bad because of pimples or marks on your skin that keep you from looking nice? YES NO o

42. Do you have some kind of work to do that you like very much? YES NO d

43. Do you feel that you are allowed to do most of the things that you enjoy? YES NO d

44. When you play, do you like to play hard? YES NO d

45. Do you feel bad because your body is not as well formed as you would like? YES NO o

46. Do you often have stomach aches? YES NO p

47. Do you often think about what you are going to be when you grow up? YES NO e

48. Do you believe that you should treat people the way you would like to be treated? YES NO e

49. Do you get dizzy rather often? YES NO p

50. Do you hum a great deal of the time? YES NO p

51. Have you been able to get even with people you do not like by refusing to speak to them? YES NO l

52. Do you try to stay away from people who will not let you do the things you like? YES NO l

53. Is someone at home usually nice to you when you are in trouble? YES NO a

54. Have you found that if you don't do it first, someone else will usually take the biggest piece of pie or cake? YES NO l

55. Do other peoples' feelings often seem to be hurt by things you say? YES NO l

56. Have you found that it pays to tell people when they have good ideas? YES NO b

57. Do your friends seem to think that you are fair with them? YES NO b

58. Do you often worry because people do not like you as well as they should? YES NO m

59. Are you often troubled because your plans do not turn out well? YES NO m

60. Can you often stop a quarrel without hurting peoples' feelings? YES NO b

61. Do you often feel that members of your family do not like you as well as you deserve? YES NO n

62. Do people often say that you have not done your work as well as you should? YES NO n

63. Do your classmates seem to think that their ideas are better than yours? YES NO n

64. Do you sometimes go camping or hiking with people of your own age? YES NO c

65. Do most of the other pupils seem to think they are better looking than you? YES NO n

66. Do you usually look forward with pleasure to the duties of the next day? YES NO d

67. Do you feel that teachers usually treat the pupils as fairly as they should? YES NO d

68. Do you worry about the things people say about you because you are too thin? YES NO o

69. Are you concerned because there are many things you cannot do on account of your weight? YES NO o

70. Are you unhappy because of the way your teeth look? YES NO o

71. Do you think that people who are either richer or poorer than you should be treated well? YES NO e

72. Do you often have headaches? YES NO p

73. Do you believe that what people do is more important than who they are? YES NO e

74. Do you think that it is as important to behave well as it is to know a great deal? YES NO e

75. Do you think that people should be as careful of other peoples' things as they are of their own? YES NO e

76. Is there someone at home who will talk with you about your problems? YES NO a

77. Have you found that you can get things quicker by demanding what you want? YES NO l

78. Do your folks let you pick your clothes or other things you need? YES NO a

79. Do the people at home often let you help decide what the family is going to do? YES NO a

80. Have you found that it pays to tell others right out about things you don't like? YES NO l

81. Do you usually go out of your way to help others? YES NO b

82. Do you often feel unhappy without knowing why? YES NO m

83. Are you often so busy with your own thoughts that you do not hear what other people say? YES NO m

84. Do you feel better when you let people know that you see their faults? YES NO m

85. Is it easy for you to get your classmates to do what they should? YES NO b

86. Are you a member of Cubs, Scouts, Bluebirds, Girl Scouts, or some other similar group? YES NO c

87. Do you like to be with your friends as much as you can? YES NO c

88. Do many people make the mistake of thinking they cannot depend on you? YES NO n

89. Do you like to go to school parties or socials? YES NO c

90. Do you need a great deal of help from your teacher in order to do your best work in school? YES NO n

91. Do you feel bad because there is something wrong with your mouth or lips? YES NO o

92. Are you troubled because there is something wrong with your feet or legs? YES NO o

93. Do you think that you are doing well in school? YES NO d

94. Do you usually feel good after you have worked or played hard? YES NO d

95. Do you have interesting things to do when you get tired of of work or study? YES NO d

96. Do you stutter some at times? YES NO p

97. Do you find that you must squint your eyes a great deal? YES NO p

98. Do you believe that people of other races are entitled to their rights? YES NO e

99. Do you have the habit of tapping with your fingers? YES NO p

100. Are you often bothered with eye strain? YES NO p

101. Does it pain you more when you get hurt than it does most other people? YES NO l

102. Do you find that it pays to get mad at people who say mean things about you? YES NO l

103. Do you have some good friends among your cousins or other relatives? YES NO a

104. Do people at home usually seem to believe the things you tell them? YES NO a

105. Are many people so unfair that they expect you to keep your feelings to yourself? YES NO l

106. Do you like to give your classmates credit for what they know? YES NO b

107. Have you found that it is best not to tell people what to do? YES NO b

108. Have people often said unfairly that you have many poor ideas? YES NO m

109. Do you find that it is hard for you to rest and take things easy? YES NO m

110. Are you often worried about what is going to happen to you? YES NO m

111. Do you like to do things rather than read or think about them? YES NO e

112. Have you found that many people are hard to get along with? YES NO n

113. Do people often seem to think that you are not as bright as you really are? YES NO n

114. When there is time do you usually play or visit with your classmates? YES NO c

115. Do you like to study with other boys or girls rather than alone? YES NO c

116. Do you worry because you think your nose is not nice looking? YES NO o

117. Do you spend part of your time reading about pets and other animals? YES NO d

118. Are there a number of things which you like to talk about with your friends? YES NO d

119. Do you sometimes feel bad because your feet are too large or too small? YES NO o

120. Have you often felt that your ears are not nice looking? YES NO o

121. Should people suffer when they do wrong? YES NO e

122. Do you believe that being happy depends more on what you do than on what others do for you? YES NO e

123. Do you sometimes walk or talk in your sleep? YES NO p

124. Are you often troubled with bad dreams? YES NO p

125. Should everyone be as careful to do what he ought to do as to ask for his rights? YES NO e

126. No matter how hard it is, do you usually get people to pay attention to you? YES NO l

127. Do you feel that your folks like to have you bring friends home with you? YES NO a

128. Do you often have good times at home with your folks? YES NO a

129. Do many people pay so little attention to your needs that you have to quarrel with them? YES NO l

130. Do you have to make a fuss because you are expected to do so many things? YES NO l

131. Have you often felt that you have more bad luck than most people? YES NO m

132. Do you usually help other people have a good time at parties? YES NO b

133. Do you usually do what you say you will? YES NO b

134. Do you usually keep from talking much about the things you know? YES NO b

135. Have you found that you sometimes like and sometimes hate the same people? YES NO m

136. Do you do several things which are of interest to other boys or girls? YES NO c

137. Have you often felt that you were left out of things you would like to do? YES NO n

138. Have you found that most people usually think about themselves and forget others? YES NO n

139. Do you feel that most people manage to get more attention than they deserve? YES NO n

140. Do you sometimes go to programs or socials with other people? YES NO c

141. When you work, do you like to work hard? YES NO d

142. Do you like your work well enough so that you do it with care? YES NO d

143. Do you sometimes feel bad because you can't do what you would like with your hands or feet? YES NO o

144. Do you often feel bad because you can't see well enough to read and do others things? YES NO o

145. Do you like to spend part of your time working or doing other things outdoors? YES NO d

146. Do some of your muscles sometimes tremble? YES NO p

147. Do you seem to catch cold very easily? YES NO p

148. Do you believe that every person has a right to his own beliefs and ideas? YES NO e

149. Is it wrong to take things you need very much if you are sure you won't get caught? YES NO e

150. Do you find that you are seldom hungry? YES NO p

151. Does someone at home help you get the money you need for things? YES NO a

152. Are many people so unfair that you have to treat them badly? YES NO l

153. Does one of your folks often take time to do things you like? YES NO a

154. Do you know someone who will keep your secrets? YES NO a

155. Do you get along best if you pay little attention to other people's feelings? YES NO l

156. Do you find it better not to tell people about their faults? YES NO b

157. Do you often feel that there is no use to keep on trying to do all the things people want you to do? YES NO m

158. Is it easy for you to like the things other people are doing? YES NO b

159. Have you found that there are very few people who are good friends for long? YES NO m

160. Have you found ways of getting out of most of the things you do not like to do? YES NO m

161. Do you sometimes help to plan or carry on a party? YES NO c

162. Are you a member of a boys' or girls' group that does interesting things? YES NO c

163. Have you often felt that you need more courage than other people if you are to do well? YES NO n

164. Do your friends seem to think that you are good at helping to get things done? YES NO c

165. Have you found that it pays to tell people about the many things you have done? YES NO n

166. Do you have good times raising animals or playing with pets? YES NO d

167. Are you often troubled because of the size of your mouth? YES NO o

168. Are you troubled because your shoulders do not look as well as those of other people? YES NO o

169. Have you often felt bad because you have many freckles? YES NO o

170. Do you sometimes enjoy yourself by going fishing, swimming, or hiking? YES NO d

171. Should people who cannot take care of themselves have help? YES NO e

172. Do you believe that most people are honest? YES NO e

173. Do you often hear a buzzing sound in your ears? YES NO p

174. Do your legs often feel too tense? YES NO p

175. Do you often have pains in your head? YES NO p

176. Do most of your friends have the traits or qualities that you like? YES NO a

177. Do you have many good talks about things with close friends? YES NO a

178. Are there some people not in your family who like to talk things over with you? YES NO a

179. Have you found that if you want to be happy you cannot depend on others? YES NO l

180. Have you found that you can often get out of trouble by stretching the truth a little? YES NO l

181. Do you find it easy to be nice to people even when they do not agree with you? YES NO b

182. Does it usually take you a long time to get over it when you are not treated right? YES NO m

183. Do your friends seem to think that you help them as much as they help you? YES NO b

184. Are you able to tell interesting stories when you have the chance to do so? YES NO b

185. Do your friends seem to think that you stand by them as you should? YES NO b

186. Do you like to trade, buy or sell things? YES NO c

187. Does it seem to you that most of your classmates are healthier than you are? YES NO n

188. Does it seem to you that most of your friends can do things better than you can? YES NO n

189. Have you found that it is usually some one else's fault when things go wrong? YES NO n

190. Do you usually take part in the things that are going on at school? YES NO c

191. Do you enjoy collecting stamps, coins, or other things? YES NO d

192. Do you often have a good time playing a musical instrument? YES NO d

193. Do you think your hair is too straight or too curly to look nice? YES NO o

194. Do you like to spend part of your time making boats, airplanes, or other things? YES NO d

195. Are you troubled because something is wrong with your arms or hands? YES NO o

196. Do you believe that most people like to see others do well? YES NO e

197. Are the muscles of your arms often tense or tight? YES NO p

198. Do you often have a stiff shoulder or back? YES NO p

199. Do you think that the world is getting better? YES NO e

200. Do you believe that most people spend too little time playing? YES NO e

MANUAL OF DIRECTIONS

MENTAL HEALTH ANALYSIS—Elementary Series

Devised by Louis P. Thorpe and Willis W. Clark
Ernest W. Tiegs, Consultant

NOTE: This Manual contains directions for giving and scoring the Mental Health Analysis either as a hand-scoring test, or with a machine-scoring answer sheet. For rapid, economical scoring see **Part VI., Directions for Scoring** on page 5.

CONTENTS

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I. Purpose of the Analysis

Every individual, from infancy on, faces the problem of making adjustments or adaptations to the complex situations with which he is surrounded. It is obviously the duty of parents, teachers, and others responsible for the child's or youth's welfare to be cognizant of the problems and hazards, as well as the favorable conditions and desirable outcomes, which are associated with the process of making these adaptations. They should also be prepared to direct and assist the child in a constructive manner. However, due to ignorance, false beliefs, and unfortunate practices on the part of their elders, many a child has neither enjoyed fair treatment nor experienced reasonable opportunities for making these adjustments. The result is a mounting toll of mental health problems.

Mental health is a priceless possession which almost everyone may preserve or attain. Yet the world is full of individuals afflicted with mental health difficulties. Some simply annoy others and, through rejection, themselves suffer most of the effects of their unfortunate maladjustments; others deceive, abuse, or persecute their associates; and still others, especially those in positions of authority, sometimes become sinister and venomous in designs which threaten communities, whole nations, and civilization itself.

Most parents live so close to their children that they fail to detect signs of incipient emotional disorders. But the schools are manned by professionally trained workers whose knowledge of personal problems of childhood and youth is increasing every year. The teacher, therefore, is one of the first lines of defense against mental health difficulties.

Both medical men and laymen have long been aware of the fact that certain mental or psychological stresses can cause individuals to manifest many of the symptoms associated with the psychoneuroses, or nervous disorders. In extreme cases, such stresses may precipitate one of the psychoses, or mental illnesses.

Immediate mental and emotional stresses do not cause nervous disorders or insanity; they merely act as immediate or precipitating factors in revealing weaknesses whose roots lie deeply buried in the past. Some of these roots may be hereditary; but there is a growing disposition to regard psychological factors as being most important. The possibility that any given individual may suffer from nervous or mental disorders appears, therefore, to depend primarily upon his childhood and adolescent experiences, and upon the seriousness of the stresses and tensions to which he is subjected.

Many authorities have called special attention to the crucial importance of childhood experiences in setting patterns of adjustment and behavior which persist more or less throughout life. So far, however, little progress has been made in utilizing this knowledge. Too many have mistakenly assumed that the period of childhood is characterized by an almost total absence of problems and responsibilities, and the presence of unusual and continuous happiness.

But the years of childhood and adolescence are filled with many hazards and difficulties, which exhaust and outrun the relatively undeveloped adjustive abilities of children and youths. Struggling for security, success, and preferment against forces and obstacles, many of which they can neither understand nor overcome, it is little wonder that each year thousands are defeated and the special opportunities of childhood lost.

Parents struggle and exhort; they pet, over-protect, and over-direct; they scold, criticize, and quarrel with their children and with each other. Teachers attempt to interest, guide, and lead; and they discipline and despair. Thus each year both parents and teachers contribute to the quota of the maladjusted, who exist in every stratum of society and in every age group. They account for an annual harvest of delinquency, crime, neurotic disorders, hospitalizations, and incarcerations which far exceed the battle casualties of all types in any war in history.

When war is imminent, nations pour millions of dollars into special programs which prepare youths to meet the stresses and tensions which they must face, and this training eliminates many as unfit; yet they traditionally spend little for special programs to aid children and youths to met the stresses and tensions of civilian life, which are just as real and hazardous, though not as spectacular, as those of war. If each community provided the same modest sum for improving mental health, there would be far less need for additional millions for ameliorative and repressive measures.

Unfortunately, members of the medical profession are rarely called upon to assist in mental difficulties until considerable damage has been done and the individual has become a patient. It is thus essential that teachers at least be provided with tools designed to aid them in the detection of evidences of mental and emotional difficulties in their incipient stages, in understanding the causes of such difficulties, and in knowing what steps to take to ward off dangers to mental health. When it is realized that many mental health problems are precipitated by unfavorable classroom conditions themselves, the importance of providing teachers with such assistance becomes more evident.

The purpose of the *Mental Health Analysis* is to assist teachers, parents, and advisors in obtaining a better understanding of the subtle forces which condition and determine mental health. It is intended to clarify certain mental health concepts that may be used as tools in attacking the problems related to mental health. It provides a method of working for the elimination of causes which have been found to operate in producing various evidences of maladjustment. In short, it is an instrument which provides (1) a means for the identification of mental health difficulties, (2) assistance in the understanding of their significance and implications, and (3) suggestions for eliminating or alleviating such difficulties.

II. The Nature and Organization of the Mental Health Analysis

The *Mental Health Analysis* has been organized in two sections of five categories each: Section 1 is designed to ascertain the presence of mental health *liabilities* which should be minimized or eliminated as far as possible; Section 2 is similarly adapted to the detection of vital mental health *assets* which should be recognized and amplified as far as possible.

The fact that a pupil has no serious mental health liabilities does not mean that he necessarily possesses outstanding or even satisfactory assets; he may still be weak and ineffective as an individual. Both sections of the Analysis deal with important factors, and both may reveal evidences of mental health difficulties. Unlike a satisfactory financial statement, in which a balance between liabilities and assets must exist, a high score on mental health assets does not necessarily offset a low score on liabilities. To be a normal, effective child the pupil must obtain reasonably high scores on both parts of the Analysis. Mental health liabilities and assets do not, as in a financial statement, have two separate and independent existences; instead, they are two different views of the same reality. The improvement of mental health involves activities which eliminate liabilities while at the same time increasing assets; or, to put it another way, activities which increase assets in turn eliminate liabilities.

An organization chart of the *Mental Health Analysis* and a brief description of the ten mental health categories follows:

ORGANIZATION OF THE MENTAL HEALTH ANALYSIS

(A Basis for Improving Mental Health)

MENTAL HEALTH: A combination of freedom from liabilities and the possession of assets

I. Mental Health Liabilities—To be minimized or corrected

- **A. Behavioral Immaturity**
- **B. Emotional Instability**
- **C. Feelings of Inadequacy**
- **D. Physical Defects**
- **E. Nervous Manifestations**

II. Mental Health Assets—To be sought or amplified

- **A. Close Personal Relationships**
- **B. Inter-Personal Skills**
- **C. Social Participation**
- **D. Satisfying Work and Recreation**
- **E. Adequate Outlook and Goals**

DEFINITION OF THE TEN CATEGORIES

I-A. Behavioral Immaturity. The behaviorally immature individual reacts on the basis of childhood (infantile) ideas and desires. He has not learned to assume responsibility for, or to accept the consequences of, his own acts. He attempts to solve his problems by such childish methods as sulking, crying, pouting, hitting others, or pretending to be ill. He has failed to develop emotional control and thinks primarily in terms of himself and his own comfort.

I-B. Emotional Instability. The individual who is emotionally unstable is characteristically sensitive, tense, and given to excessive self-concern. He may substitute the joys of a phantasy world for actual successes in real life. He may develop one or more physical symptoms designed to provide him with an escape from responsibilities and thus to diminish his distress. He is quick to make excuses for failure and to take advantage of those who will serve him.

I-C. Feelings of Inadequacy. The inadequate individual feels inferior and incompetent. This feeling may be related not only to particular skills or abilities but may be general in nature. Such a person feels that he is not well regarded by others, that people have little faith in his future possibilities, and that he is unsuccessful socially. He feels that he is left out of things because he is unattractive and because he lacks ability.

I-D. Physical Defects. The individual who possesses one or more physical defects is likely to respond with feelings of inferiority because of unfavorable comparisons or of handicaps in competition with other persons. It is usually not the physical defect *per se* that brings unhappiness but the restrictions and social disapprovals which come in its wake. Thus the extremely short, the homely, or the crippled individual may feel that his handicap is insurmountable.

I-E. Nervous Manifestations. The individual who is suffering from nervous symptoms manifests one or more of a variety of what appear to be physical disorders such as eye strain, loss of appetite, inability to sleep, chronic weariness, or dizzy spells. Persons of this kind may be exhibiting physical (functional) expressions of emotional conflicts. Stuttering, tics, and other spasmodic or restless movements are also symptomatic of this type of mental ill-health.

II-A. Close Personal Relationships. The individual who possesses this asset to mental health counts among his acquaintances some in whom he can confide, who show genuine respect for him as a person, and who welcome close friendship of a warm and substantial nature. Such an individual enjoys a sense of security and well-being because of having status with those who mean something to his welfare.

II-B. Inter-Personal Skills. The socially skillful individual gets along well with other people. He understands their motives and is solicitous of their welfare. He goes out of his way to be of assistance to both friends and strangers and is tactful in his dealings with them. The socially skillful person subordinates his egoistic tendencies in favor of the needs and activities of his associates.

II-C. Social Participation. The socially adjusted individual participates in a number of group activities in which cooperation and mutuality are in evidence. In contrast to the isolate who prefers his own company, the mentally healthy individual enjoys the companionship of others. His willingness to contribute to the success of group endeavors provides him with the feeling of belongingness and of having status which his nature requires.

II-D. Satisfying Work and Recreation. The well-adjusted individual experiences success and satisfaction in his work, whether it be the seeking of an education or occupational relationships in the world of professions, industry, or business. He also participates in a variety of hobbies and recreational activities which provide release from tension. He will have chosen tasks that challenge him and that satisfy his need for approval and a sense of achievement.

II-E. Outlook and Goals. The mentally healthy individual has a satisfying philosophy of life that guides his behavior in harmony with socially acceptable, ethical, and moral principles. He also understands his environment and the forces and cause and effect relationships which shape his destiny as a member of a social group. He establishes approved personal goals and makes reasonable progress toward their attainment.

III. Reliability

The status of outcomes of learning such as knowledges, understandings, and skills, once attained, remains relatively stable; and tests designed to reveal their presence may possess correspondingly high statistical reliability. On the other hand, feelings, convictions, and modes of behavior may change frequently in accordance with new experiences. Some of the items of the Analysis touch rather sensitive personal and social areas, and attitudes may change in a comparatively short time. For these and other reasons, the statistical reliability of instruments of this type will sometimes appear to be somewhat lower than that of good tests of ability and achievement.

However, the reliability of the *Mental Health Analysis* does not suffer by comparison with many widely used tests of mental ability and school achievement. The following correlations were obtained by use of the Richardson-Kuder formula based on 980 cases:

	r	*S.D. dist. score*	*P.E. est. score*
Total Score	.954	28.0	5.7
Sec. 1. Liabilities	.924	16.0	4.1
Sec. 2. Assets	.906	13.0	3.7

IV. Validity

The validity of any instrument is dependent not only upon its intrinsic nature but also upon the manner in which it is used. The latter point is an important consideration in the validation of instruments in the mental health field. Among the factors of importance that are related to the validity of the present test are the following:

A. Selection of Items

B. The Mental Health Categories

C. Test Item Disguise

D. Limitations

Each of these factors will receive brief consideration.

A. Selection of Items

Adequate selection of test items is, in general, the best guarantee of the validity of any testing instrument. The items of this Analysis have survived a thorough process of selection, including a study of the literature and researches in this field, reactions of students, teachers, principals, and employees, and the use of statistical computations further to improve the quality of the total sampling of items which were obtained for use. This included an individual item analysis.

B. The Mental Health Categories

The ten categories presented in Part II of this Manual represent functionally related groups of crucial, specific evidences of mental health assets or liabilities; their names correspond to some of the most important present-day mental health concepts which are used to describe normal growth and development. The items of each category represent fundamental adjustment patterns. The obtained correlations among catagories emphasize the unity or "wholeness" of normal individuals; as would be expected, these categories are not mutually exclusive.

C. Test Item Disguise

The authors have been sensitive to the inability of some individuals to paint accurate self-portraits. They have attempted to nullify the effects of these tendencies in two ways; namely, by disguising as many items as possible which might conflict with the individual's tendency to protect himself, and by providing outside checking devices as indicated in Part X.

The authors do not ask, "Are you immature?" but rather, "Are you quick enough to get the best seats at a program?" They do not ask "Are you rude?" but rather, "Are many people so unfair that you have to treat them badly?" They do not tempt the student to detect their purpose by asking, "Do you offend people?" but rather ask, "Have you found that many people's feelings are easily hurt?"

In many such instances the facts about an individual's mental health are not as important as *the way he feels and what he believes concerning them,* since such beliefs and feelings are frequently the keys to his intimate mental health status, as well as to his possible improvement.

D. Limitations

Practical considerations have limited the Analysis to a maximum of two hundred items. Many others might have been used to obtain a more complete sampling. However, it is possible that a careful selection of items has produced a relatively short instrument which is as reliable and useful as one of greater length.

Language difficulties may affect the usefulness of achievement, intelligence, and personality tests. In spite of the safeguards used, the present Analysis probably has not escaped the influence of this shortcoming. The differing points of view and attitudes of those who real the items will, no doubt, result in interpretations somewhat at variance from those intended. The varying language abilities of individuals also produce some discrepancies in understanding and response. Changing attitudes and a lack of self-knowledge are other problems which must be faced. However, the authors have evaluated the language of these analyses by means of the Lewerenz Vocabulary Grade Placement Formula, and have kept the language difficulties considerably below the reading abilities of those who will use the Analysis at different levels.

V. Directions for Administering

It is possible to give the *Mental Health Analysis* as the usual hand scored test, or with a machine-scoring answer sheet which may be scored; either by the I B M test scoring machine or with a set of special hand-scoring stencils. The procedures to be used in each of these methods of administration are given below.

When the *Mental Health Analysis* is to be given to a large number of persons, it is usually advisable to use machine-scoring answer sheets and score them with the IBM machine or manually with a special hand-scoring stencil.

The *Mental Health Analysis* consists of 200 questions which are answered by a response of Yes or No. The responses thus obtained are classified into five groups of mental health liabilities and five groups of mental health assets as explained in Part II of this Manual.

A. Directions When Answers Are to be Marked on the Analysis Booklets

Individuals taking the Analysis should have a test booklet and preferably a lead pencil with an eraser. There is no time limit for the Analysis and each person should be permitted to answer all the items. Ordinarily the responses can be given in a period of 45-50 minutes.

The directions to be read to the examinees are in black type.

Instruct the individuals being tested to record the identifying data on the front page of the *Mental Health Analysis* booklet. After this record is completed, state: **This booklet contains questions about a number of things which will show how you feel or think about them. The answers are not right or wrong but show your beliefs or ideas about the questions. Some will answer YES and others will answer NO to the same question.**

You are to mark your answers on this booklet. The questions are to be answered by making a circle around the YES or the NO. Notice the examples on the front page of the booklet: A. Have you ever been to a moving picture theater? YES NO. Now make a circle around your answer, either Yes or No. B. Are you less than 16 years of age? YES NO. Put a circle around your answer.

On the following pages are more questions. On some of them you will make a circle around YES, and on others you will make a circle around NO.

When told to begin you are to go right on from one page to another until you have answered all of the questions.

Open your booklets. Begin.

When an examinee has completed the booklet, it should be handed to the examiner, unless a plan of self-scoring is to be used. (See Sec. VI, Directions for Scoring.)

B. Directions When Answers Are to be Marked on Machine-scoring Answer Sheets Which Are to be Machine Scored

When the special answer sheets are to be scored by the IBM test scoring machine, it is necessary that special electrographic lead pencils be used. When these answer sheets are used, the individuals being tested should not write on the *Mental Health Analysis* booklet, but record their names and responses on the answer sheets.

Read aloud the directions given on the answer sheet while examinees read silently.

After having the individuals being tested mark their responses on the sample questions, state:

This booklet contains a number of questions concerning how you feel or think about a number of things. The answers are not right or wrong but show your beliefs or ideas about the questions.

Continue right through the booklet answering all of the questions either YES or NO.

When pupils have finished, say: **Turn your booklet over. Keep your answer sheet and the special pencil, but hand in the booklet.** Collect immediately, checking all returns. **Now, inspect your answer sheet. Are all your marks heavy black lines? If not, go over the light ones and blacken them well. Have you made any accidental dots or marks? If so, erase them. Are any of your erasures untidy? Make your answer sheet clean and neat.** After sufficient elapsed time, state: **Hand in your answer sheet. Hand in the special pencil.** Collect the answer sheets and pencils separately, as a convenient means of checking returns.

C. Directions When Answers Are to be Marked on Machine-scoring Answer Sheets Which Are to be Hand Scored

The instructions to be given when the special answer sheet is to be hand scored with a stencil are the same as when it is to be machine scored, except that it is not necessary for examinees to use the special electrographic lead pencils. (See Sec. B.)

VI. Directions for Scoring

The experiences of many users have shown conclusively that the *Mental Health Analysis* can be most expeditiously and accurately scored, when the machine-scoring answer sheet is used. Machine or manual scoring of the answer sheet not only greatly facilitates the scoring process, but also achieves marked economy of time.

A. Hand Scoring the Mental Health Analysis Booklets

Immediately below the response to each question is a small letter which is the code to the particular mental health liability or mental health asset covered by the question. The five liability categories are classified **l,m,n,o,p**; the five asset categories are classified **a,b,c,d,e.** The desirable responses for each liability item is **no** and the desirable response for each asset item is **yes.**

The procedure recommended for hand scoring the *Mental Health Analysis* is as follows:

1. Read the response recorded on the answer key.

2. Using a colored pencil or crayola, check the small letter under the response **only when** it agrees with the key. (The items not checked represent the undesirable beliefs or attitudes.)
3. Count the individual letters thus checked and record the number at the bottom of each page in the spaces provided.
4. Add the scores for each letter, as shown at the bottom of pages 2-8, and record this sum in the appropriate space on the front page of the booklet (to the right of the letter in parentheses).

Note: It may aid in counting scores to know that each letter continues to recur in a group of five questions after twenty-five other questions have intervened; for example: a and l in 1-5, 26-30, etc., b and m in 6-10, 31-35, etc.

B. Machine Scoring the Mental Health Analysis Answer Sheets

When the IBM test scoring machine is used, the *Mental Health Analysis* may be scored by two insertions of the answer sheet. Complete instructions are printed on the stencils.

C. Hand Scoring the Mental Health Analysis Answer Sheets

By superimposing the special hand-scoring stencil on the machine-scoring answer sheet, the marked desirable responses show through round openings. These marked items are counted for each section as explained on the stencil and the score recorded on the answer sheet in the space provided.

VII. Directions for Recording and Charting Scores and Percentiles

The steps in recording and summarizing data on the front page of the booklet are as follows:

1. Transfer the section scores of each of the ten components to the right of the letters **l,m,n,o,p** and **a,b,c,d,e** in the column headed "Score."

2. Add the scores of Section 1, **l,m,n,o,p**, to obtain the Liabilities Score.

3. Add the scores of Section 2, **a,b,c,d,e**, to obtain the Assets Score.

4. Add the Liabilities and the Assets Scores to obtain the Total Score.

5. To determine percentile ranks for each section and for the total, refer to the table of percentile norms on the last page of this Manual. (See illustration on page 7.)

Directions for interpretation of these data and for guidance are given in Part IX. Briefly, it may be stated that maladjustment in the various categories is indicated when the score is among the lower percentiles, or when the percentile graph tends to the left. Please note that since *liabilities* represent mental health difficulties, the test has been so devised that a *high* percentile score means a *favorable* score, and is to be interpreted as *freedom from* behavioral immaturity, emotional instability, feelings of inadequacy, etc. In such instances the percentile graph tends well to the right.

Consequently, an increase in *assets* and the elimination of *liabilities* is indicated when the pupil's score is among the higher percentiles, or when the percentile graph tends to the right.

VIII. Sample Profile

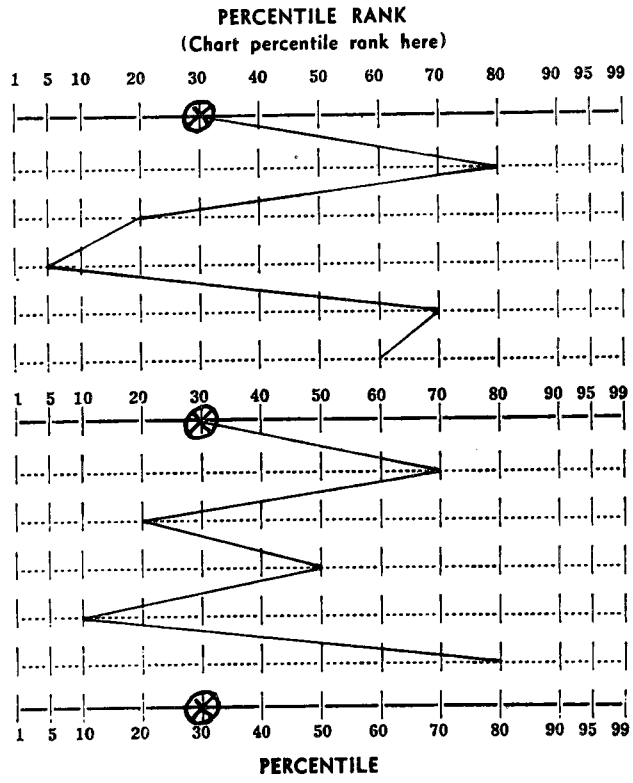
Fifth Grade boy given the Elementary Series of the Mental Health Analysis

Name *William Jones* Sex: (Boy)—Girl

School *Second Street* Age *11* Last Birthday *May 12*

Teacher *Miss Smith* Grade *5* Date *June 4*

		Score	Percentile
1. Lib.		57	30
A. Beh. Im.	(l)	16	80
B. Em. Ins.	(m)	8	20
C. Fl. Ina.	(n)	4	5
D. Ph. Def.	(o)	18	70
E. Ner. Man.	(p)	15	60
2. Ast.		70	30
A. Cl. Per. Rel.	(a)	18	70
B. Intp. Sk.	(b)	11	20
C. Soc. Par.	(c)	15	50
D. Sat. W. and R.	(d)	9	10
E. Ot. and Gls.	(e)	17	80
Total Score		127	30



The responses of this boy to the questions in the Mental Health Analysis, while slightly below average for individuals of the same age on Liabilities, Assets, and Total Score, indicate that he has rather serious Feelings of Inadequacy (Sec. 1C) and a low score on the category of Emotional Instability. (Sec. 1B). In regard to assets, he has a low score on Satisfying Work and Recreation (Sec. 2D) and on Inter-Personal Skills (Sec. 2B). It is evident that these two Assets categories are indicated as the most obvious areas to be dealt with in treating the factors of emotional instability and feelings of inadequacy in this case. An examination of responses to the questions in these particular categories will undoubtedly reveal specific situations and attitudes which will clarify the problem. Definite suggestions in this regard are presented in Sec. IX of the Manual of Directions.

Supplementary data regarding mental ability, school achievement, interests, and the like, should be given consideration in determining causal factors.

IX. Using the Results of the Mental Health Analysis

A. The Significance of M. H. A. Scores

In general, the method of interpreting the scores of the *Mental Health Analysis* may be stated as follows:

1. *Total Score.* Inspect the total score and its corresponding percentile rank which furnishes a comparison with pupils of a similar group. The lower this total score and percentile rank the greater the indication of poor mental health. A score which approximates the norm or average is not necessarily satisfactory; the more insight the teacher can assist the pupil in obtaining with regard to his own reactions, the farther the latter can go in facing reality in solving his problems, and in developing adjustment patterns which will serve him well throughout life. These gains will be reflected in increasingly higher scores, which are evidences of better mental health.

Many teachers will tend to give special attention to pupils who have the lowest scores. However, there is no more reason for giving such pupils a disproportionate amount of her time than there would be for guiding only a few in acquiring skill in reading while neglecting others. But a variety of mental health difficulties may develop from relatively few causes; and when the teacher is able to trace many diverse behavior symptoms back to these causes, her problem is greatly simplified.

2. *Mental Health Liabilities Score.* After determining how a given pupil compares with other pupils in general, the next step is to examine the Mental Health Liabilities Score in the same manner and compare it with the corresponding percentiles for pupils of a similar group. The larger the number of mental health liabilities a pupil manifests the lower is his score, and the greater the need for teacher assistance.

3. *Mental Health Assets Score* . The teacher next examines the score and corresponding percentile rank for Mental Health Assets. The higher this score the greater the mental health assets of the pupil and the less the neccessity for special attention However, most pupils show considerable unevenness in the extent to which they manifest liabilities and assets; most pupils possess some of each, and thus need assitance in both areas.

4. *Mental Health Categories.* Although examination and interpretation of the total score, the liabilities score, and the assets score increases the teacher's understanding of a pupil's mental health, the ten category sub-scores constitute the basis of pupil guidance in improving mental health. Each one should be examined and compared with the appropriate norm as in the case of the three scores already discussed.

The teacher may be tempted to deal with only the one or two areas or categories in which a pupil's scores are lowest, but this is an error; all data regarding the pupil should be analyzed and the factors considered in relationship to each other.

The following method is recommended for pupil guidance. As teachers gain experience in using the results of this analysis, they will be able to economize time through securing most of the necessary data by inspection instead of by making lists of them.

a. Examine each of the category scores. The lower the score, the more likely a given category is to reveal clues to the causes of difficulty.

b. Examine the list of probable causes (Sec. IX. B) of difficulty which is provided for each category. Since a variety of mental health difficulties may stem from a limited number of causes, there may be some duplication here. The larger the number of such duplicates among the low score categories, the greater the chance that these factors are the causes of difficulty. Make a list of these potential causes.

c. Check each of these potential causes (such as quarreling in the home, lack of ability, failure in school, and the like) and endeavor to determine the facts regarding the pupil under consideration. Make a list of the remaining potential causes.

d. Check the list of recommended treatment activities for such categories as are represented in the remaining list of potential causes. There may be some duplicates among the suggestions for treatment. The larger the number of such duplicates, the greater is the chance that they are the appropriate ones for treatment.

e. Use this list of suggestions for pupil guidance in eliminating mental health liabilities and in increasing mental health assets.

B. Diagnosis and Treatment of Mental Health Liabilities

1. *Behavioral Immaturity* (1A of the Profile). Difficulties of this type may be caused or precipitated by such factors as the following:

a. Actual chronological immaturity in relationship to assignments (expectations)

b. Conflicting authority in the home; quarreling between parents

c. Teasing by brothers and sisters.

d. Childhood illnesses, the effects of which (attitudes of dependence, helplessness, etc.) persist after the child recovers

e. Over-protection and over-direction on the part of parents; not enough responsibility on the part of the individual.

Note: The general method of analysis and identification of causes has already been presented in Part IX, paragraphs 1 to 4, inclusive, above. After the teacher has made her list of potential causes in low score categories, and has eliminated those which are apparently not operating in the difficulties of a particular individual, she should check the following lists of suggestions for treatment; treatment for the difficulties which exist in each category are found below the corresponding category.

In treating behavioral immaturity

a. Be sure that the pupil is provided with tasks, responsibilities, activities, etc., which are within the limits of his abilities.

b. Provide ego-building responsibilities. Appoint the pupil a library assistant, monitor, custodian of erasers or athletic equipment, etc., so that he will feel useful. Such activities are conducive to the development of more mature behavior.

c. Provide opportunities for success in work or play. Every pupil should be enabled to enjoy a feeling of adequacy and competence in the school or home environment.

d. Reward mature conduct as the pupil develops. Praise judiciously for effort, for assistance to others, for poise under difficult circumstances, and allow pupils to play cherished games when they show gains in behavorial maturity.

e. Since any activity which makes pupils feel worthy and needed tends to increase behavioral maturity, provision should be made for pupil participation in such activities.

f. Teach pupils (under motivated conditions) definite social skills—the correct way to respond in situations in which they customarily resort to infantilisms.

g. As soon as pupils are sufficiently mature assist them in gaining insight into their own reactions. Explain the basic human needs or dynamics of conduct,[1] the nature of obstacles, and desirable modes of response.

2. *Emotional Instability* (1B of the Profile) may be caused or precipitated by such factors as the following:

a. Emotional conflicts; inability of the pupil to choose between two or more courses of action in solving a problem when all involve undesirable consequences

b. Anxiety states, which are closely related to instability

c. Masturbation, lying, stealing, and other violations of the group mores

d. Rejection by parents or classmates

e. Unattractiveness leading to embarrassment

f. Fixations on parents. Some children and youths are so strongly attached, emotionally, to a parent that they do not develop properly as independent personalities. They are usually concerned about their status with classmates, and are afraid of defeat in endeavoring to associate with them.

g. Repression. Some pupils attempt to repress into the unconscious their memories of frustrated desires. Such repressions may express themselves in the types of behavior represented in this section of the Analysis

Emotional instability is treated primarily by assistance in resolving emotional conflicts and in finding relief from anxiety.

a. Provide opportunities for and encourage the pupil to talk about his difficulties.

b. Encourage close personal relationships between the pupil and others who are well adjusted.

c. Adopt a permissive attitude in dealing with the pupil; if his difficulties arise from over-domination, give him as much freedom as possible in expressing himself, in selecting friends, and in making other types of decisions.

d. Encourage the pupil to learn to relax;[2] when most persons believe they are relaxing, even when lying down, they still have many residual tensions which they can learn to eliminate.

e. Encourage participation in group games and other activities.

f. Assign the pupil tasks, in school and elsewhere, in which he can succeed.

3. *Feelings of Inadequacy* (IC of the Profile), may also arise from a variety of causes:

a. Rejection by parents, friends, or classmates

b. Lack of affection on the part of parents and friends

c. Insecurity arising from home conditions, failure at school, lack of hope for future, etc.

d. Hostile attitudes on the part of parents, teachers, friends, classmates, etc.

Feelings of inadequacy are treated by providing security and confidence leading to growth in understanding and to changes in attitudes and activities.

a. Provide affection in the school and the home.

b. Permit the pupil to assume responsibilities and to make decisions appropriate to his age and maturity.

c. As far as possible, avoid criticism or mention of failure. Provide tasks at which the pupil can succeed; praise him judiciously; and make him feel normal, worthy, and competent.

d. Encourage the pupil to participate in group activities. Have him perform services which are useful to others; show and express interest in his progress; and make him feel that he belongs to the group.

e. Gradually, and in harmony with his increasing maturity, assist the pupil in gaining insight into his needs, motives, and reactions.

f. In the case of severe or prolonged manifestations of symptoms, refer the pupil to a psychologist or psychiatrist for treatment.

4. *Effects of Physical Defects* (1D of the Profile), particularly those which are psychological in nature, constitute definite mental health hazards. Physical defects may be hereditary, may result from birth trauma or later accidents, or may be caused by disease. The defect itself often denies the child normal channels of expression, the opportunity to pursue desirable life activities, and to achieve his objectives. As a

[1] Prescott, Daniel, **Emotion and the Educative Process**, Am. Council on Education, 1938. Thorpe, L. P., **Personality and Life**, Longmans, Green & Co., 1941, Chap. 1 Also Tiegs, E. W. and Katz, B., **Mental Hygiene in Education**, The Ronald Press Co., 1941.

[2] Jacobson, Edmund, **You Must Relax**, McGraw-Hill Book Co., 1934. Also Fink, David, **Release From Nervous Tensions**, Simon and Schuster, 1942.

result, the following factors often contribute to mental ill health:

a. The pupil is shown too much attention and is relieved of too many responsibilities which he can and should carry.
b. The pupil has no opportunity to take responsibility and make decisions regarding his own welfare.
c. His defeat causes him to suffer frustrations and these in turn give rise to feelings of inadequacy.
d. If unable to compete with others on equal terms, he often worries about his future, and suffers from feelings of insecurity.
e. His inability to compete and to achieve in various ways leads to a feeling of lack of recognition.
f. The child often seeks recognition by becoming boisterous, disobedient, and quarrelsome; and these reactions in turn lead to attacking or rejecting responses on the part of parents, teachers, and classmates.

The effects of physical defects are treated by leading the pupil to face his handicap, to accept the limitations that have been imposed upon him as a result, and to secure recognition and security through desirable forms of compensation.

a. Ascertain the nature of the defect and the handicap it represents to the pupil.
b. Determine the attitude of the pupil toward his physical defect. If the pupil is young also ascertain the attitudes of his parents.
c. As far as possible, treat the pupil as a normal person. Avoid reference to the handicap, pity and undue sympathy, and unfavorable comparisons with others.
d. Provide a positive program for preventing or eliminating any psychological effects of the defect. Adjust the child's school program or his work in such a way as to avert any disadvantages brought about by his handicap; keep him occupied with activities in which he is interested and can succeed; stress his strong points and assist him in developing his highest potentialities; and assign him responsibilities which contribute sufficiently to the group with which he is associated that he comes to regard himself, and to be regarded by the other members of the group, as being essential.
e. As the child becomes more mature, assist him in understanding his own behavior.

5. *Nervous Manifestations* (1E of the Profile) may have a physical basis, but many manifestations of nervousness are merely outward expressions of emotional conflicts and are closely related to the phenomenon of emotional instability. Among the factors which cause or precipitate nervous symptoms are the following:

a. Parental domination, which suppresses the child's inclinations and activities
b. A lack of opportunity for normal emotional expression
c. Repression of the desire for recognition when it is denied
d. The repression of guilt feelings arising from hatred of parents, sexual irregularities, and the like
e. A lack of success in school or elsewhere
f. Inability to make or keep friends
g. Fear of teachers, of examinations, and of impending failure
h. Lack of interests which challenge, or of opportunities to do interesting things.

Nervous symptoms which are not of physical origin may in some instances be eliminated by providing for emotional release and normal emotional expression through the resolution of conflicts. In case of doubt as to the origin of the symptoms, an examination by a competent physician is always the first step.

a. Provide opportunities and encourage the child to talk freely about his repressions or conflicts.
b. If the child is young, guide the re-education of his parents, especially the mother, in accepting him emotionally.
d. If the child is in school, the teacher should both accept him and adjust his school program in such a way as to enable him to succeed.
e. Encourage the child to engage in satisfying play and recreation.
f. Insofar as the child's maturity permits, assist him in gaining insight into the reasons for his symptoms.
g. In the case of severe or persistent manifestations of symptoms refer the child to a psychologist or a psychiatrist competent to administer such therapies as catharsis, psychoanalysis, hypnoanalysis, and the like.

C. The Development and Amplification of Assets

Attention has already been called (Part II) to the close relationship which exists between the mental health liabilities and assets of a given child. The same casual factors may precipitate several forms of mental ill-health. Lack of success in school, for example, may cause overt immature behavior or nervous symptoms; teacher or parental domination may precipitate immature behavior, cause feelings of inadequacy, bring about conflicts which result in emotional instability, or be responsible for certain nervous manifestations.

In a similar manner, the effects of various forms of treatment may spread to several categories and aid in eliminating a number of mental health liabilities. Thus, providing affection and a feeling of security for the child in school aids in making him more successful in his school tasks, a development which in turn often reduces feelings of inadequacy and certain aspects of emotional instability. Planning activities and creating an environment which gives the child a feeling of usefulness, of being needed, and of being accepted by the group, reduces or eliminates many aspects of mental health liabilities.

Developing mental health assets, therefore, aids the child in two ways:

First. It makes him more attractive and useful to others, and marks him as a more normal, happy, and effective individual.

Second. It aids in the further elimination of liabilities which make th eindividual ineffective socially and unacceptable to others.

Low or unsatisfactory scores on mental health assets categories constitute evidence of the need for planning activities which will increase or amplify them. The reader is reminded that as a result of the analysis and identification of causes of certain mental health liabilities a group of activities has already been suggested that may prove helpful in a direct attack on such liabilities. Where unsatisfactory assets scores and liabilities scores are closely related, the remedial activities proposed for improving the former will be similar to those already suggested for eliminating liabilities; but when this relationship is more remote there will be a corresponding difference in the therapeutic activities suggested.

A list of activities for amplifying each assets category in which the pupil's score proves to be unsatisfactory is offered below. A few typical difficulties, together with suggestions for dealing with them, are presented in each case.

1. *Close Personal Relationships* (2A of the Profile)

a. Pupils who lack sufficient ability to get along with others.

Example: A sixth-grade teacher hit an annoying pupil on the head with a book before the members of the class. She had reached the end of her endurance. However, the boy became a teacher hater; and although he had the capacity to adjust in many other situations, his adjustment assets were unequal to this problem.

Suggestion: Make arrangements with an understanding teacher, counselor, or other member of the school personnel to take special responsibility for the pupil. Provide recognition and status through showing an interest in his hobbies, problems, career, and the like. Assist him to participate in activities which he likes and which help him to succeed as far as possible. Lead him to understand that teachers are human and that he must learn not to annoy others but to get along with them.

b. The child with too few personal friends.

Example: There were two such boys in a class. They got together on an interest in airplane motors. Later they gained favor with others by showing them their various airplane models.

Suggestions: Endeavor to find a schoolmate who has some interests in common with the isolated pupil or who is himself somewhat isolated socially. Bring these two together in both classwork and school activities. Recognize their achievements (even though meager) and later draw them into a larger and more active social group.

c. Pupils who lack someone in whom to confide.

Example: A pupil who was failing in school because of apparent lack of interest confided that his parents were quarreling continuously and that he had a number of unsolved health problems.

Suggestion: Arrange to have a teacher or other member of the school personnel make a special study of the pupil with a view to befriending him and subsequently drawing him out about himself. Such emotional release can be secured by easy stages if the teacher and pupil become compatible and talk frequently about matters of concern to the latter. Instead of giving advice, the teacher should be a good listener, provide a permissive atmosphere, and assist the pupil in gaining an understanding of his frustrations and what can be done about them.

2. *Inter-Personal Relationships* (2B of the Profile)

a. Pupils who fail to go out of their way to help others.

Example: An unpopular boy acquired (through a teacher's suggestion) a number of friends by helping arrange the school stage for plays. A disliked but talented girl, at the suggestion of her teacher, taught her classmates to draw and paint. She quickly won their friendship.

Suggestion: Show the individual that the popular pupils are those who often help their associates in accomplishing their purposes. Then point out specific examples of how such a social skill can be used.

b. Pupils who constantly deflate others.

Example: A sixth-grade girl made slighting remarks about the nationality of several of her classmates, inferred that they were "dumb," talked about them behind their backs, and intimated that they were socially inferior.

Suggestion: Show the pupil that one must make others feel adequate to win their esteem. Explain how deflating one's associates is not the way to win or retain friendships. Show how these tactics can be reversed to make others feel competent and important. Give people credit for accomplishments and notice them favorably from time to time.

c. Pupils who fail to return treats.

Example: A ten-year-old boy had developed the habit of "sponging" on his classmates and rarely reciprocated. He was always thrilled over getting something for nothing. He wondered why he was so often shunned.

Suggestion: Show pupils of this kind how similar mistakes can be made almost unwittingly, and how damaging to inter-personal relationships they can be. Give illustrations of both the results of such thoughtlessness and the benefits of reasonable generosity. Have the pupil keep a record of successes and report them for a time.

3. *Social Participation* (2C of the Profile)

a. Boys and girls who are timid.

Example: Two shy boys and a shy girl continued to avoid members of the opposite sex on the playground and in the school.

Suggestion: One school used a unit on Indians as a point of departure to correct this excessive shyness. Each shy boy (brave) and each shy girl (squaw) was paired with a less shy member of the opposite sex; and they worked together as a team setting up a wigwam for the duration of the unit.

b. Girls who take too little part in group activities.

Example: A fifth-grade girl, who knew how to sew and paint, never participated in a social or group activity of any kind.

Suggestion: Draw such pupils into school activities such as singing, drawing, and collecting, and subsequently involve them in one or more group enterprises along these lines. One girl was influenced to become a member of her class chorus and gradually learned to cooperate with others, bear her share of responsibilities, and enjoy the company of both boys and girls.

c. Boys who prefer reading and other sedantary pursuits.

Example: An attractive eleven-year-old boy hurried home as soon as the school day ended each day and read books almost incessantly thereafter.

Suggestion: The school should start a boy scout enrollment campaign or arrange to have a dynamic scout leader interest such boys in joining an organization already established in which they can be introduced gradually to stimulating group activities. Such activities as class swimming parties, hikes, hobby groups, or groups to promote collecting have been used successfully.

4. *Satisfying Work and Recreation* (2D of the Profile)

a. Pupils to whom school work is uninteresting.

Example: One unhappy looking pupil seemed to get no joy or satisfaction out of her school work. She constituted a serious problem for her teachers.

Suggestion: The teacher or counselor should consider the possibility that such a pupil is taking courses that are inappropriate for her or that are not adapted to her maturity level. A mental test, a diagnostic achievement test, and an interest inventory might well be administered and interpreted in the light of other data secured through school records and interviews. There is also the possibility that serious failures and other frustrations have led to an emotional block inimical to further progress.

b. Girls without hobbies or recreational releases.

Example: A new girl was lonely and isolated because there were no activities to occupy her spare time.

Suggestion: The school should promote a number of hobby groups. Have members give short talks describing their hobbies and how they are carried on. Plan exhibits prepared by groups, thus avoiding too much emphasis on individual competition. Regardless of the value of their contributions, make sure that girls without previous interests of this kind receive some appropriate recognition and that they have good times with other participants.

c. Boys who have too little time for reading.

Example: One hard-working boy spent all of his time on a paper route, home work, required piano practice, and other duties. He had no time for free reading.

Suggestion: Go over the daily program of such a boy and work out a better time schedule. Indicate where he is wasting time or possibly engaging in useless or non-satisfying activities. If home conditions are unsatisfactory, endeavor to enlist the cooperation of parents in providing the boy with a certain amount of free time. Discontinuance of hated music lessons and a more tolerant attitude on the part of his parents gave one boy the opportunity of reading a whole series of valuable and inspiring books.

5. *Outlook and Goals* (2E of the Profile)

a. Pupils who do not have a clear-cut conception of right and wrong.

Example: A certain boy continued to steal and lie, to ignore promises and responsibilities, and to be disloyal to teachers, parents, and other pupils.

Suggestion: Explain that ideas of right and wrong differ in different cultures (use illustrations) but that in this country there are in the main two points of view: (a) That actions and attitudes which the Bible or the church declares to be right or wrong are always so (idealism), (b) That actions and attitudes are right or wrong in terms of their effects on the welfare of people in general (pragmatism). Show that it has taken hundreds of years for society to develop satisfactory moral and ethical codes and that these must be followed if it is to survive. Avoid moralizing. Stress the individual's welfare. Above all, set up concrete situations in which such a boy gets the things he wants most and enjoys life most fully when he observes the mores of society (is honest and loyal).

b. Pupils who do not believe in the Golden Rule.

Example: A thoughtless girl made so much noise that others could not study, stepped ahead of classmates in lines, tried to get the best seat in the auditorium, and never seemed to consider the rights or feelings of others.

Suggestion: Explain that this rule represents a great racial achievement in group living and that it is not based on the arbitrary demands of either a God or of society. Give concrete examples of what would happen if each of us were egocentric and looked out exclusively for ourselves. Also arrange several situations in which this girl will secure recognition and status through treating her classmates fairly.

c. Pupils who are dishonest.

Example: Two boys in the sixth grade seldom returned money they had borrowed, failed to turn in articles they found, and never hesitated to distort the truth to gain an advantage.

Suggestion: Without eulogizing honesty, explain what would result of everyone treated the property and reputation of others in this manner for purposes of personal gain or aggrandizement. Picture the chaotic condition of society under such a program. Explain the function of laws and restraints as social controls. End by showing that the individual himself is better off in the long run if he is honest. Honesty is the best policy, not only because it is said to be right, but because it tends to guarantee the security of all concerned. Make it a point to reward honesty in tangible ways, especially in the case of boys such as those mentioned above.

X. Directions for Checking Profiles Which Appear to Diverge too far from Observed Mental Health

If an individual appeared ill or disturbed when responding to the questions of the Analysis he should be given an opportunity to repeat the exercises at a more favorable time.

If lack of reading ability was a disturbing factor the examiner may give and interpret orally such parts of the Analysis as appear to be in conflict with his observations.

If it appears that the individual has consciously misrepresented himself, a number of checks are possible with most of the items:

1. Others who are familiar with the individual may be asked to respond to the items in question.

2. A few individuals who know each other well may be asked to complete analyses for each other, including the individual under examination.

3. After the parents have been appraised of the nature and objectives of the Analysis, they may be asked to complete the items in question.

4. The individual may be requested to repeat his performance at another time.

5. The examiner may keep a record of careful, systematic observation over a sufficiently extended period of time to obtain an adequate sampling of the individual's characteristic behavior.

It should be remembered that not many such problem cases arise. The major purpose of the Analysis is to detect the actual or incipient difficulties of normal individuals. But when apparent discrepancies arise between responses and the examiner's observations it is essential to determine the facts in order that remedial activities may be intelligently directed. The examiner should not trust his informal opinions too far; evidence from the profile will usually be much more valid.

XI. Administrative Uses

Although this Analysis has been designed primarily to aid teachers in detecting and dealing with mental health problems, its usefulness is not confined to the individual classroom.

The normative data, or scores on the various categories of the Analysis, should be summarized on the blanks provided. There are thirteen such scores:

(1) Total Score (average mental health status)
(2) Mental Health Liabilities Score
(3) Mental Health Assets Score
(4) Behavioral Immaturity Score
(5) Emotional Instability Score
(6) Feelings of Inadequacy Score
(7) Effects of Physical Defects Score
(8) Nervous Manifestations Score
(9) Close Personal Relationships Score
(10) Inter-Personal Skills Score
(11) Social Participation Score
(12) Satisfying Work and Recreation Score
(13) Outlook and Goals Score

There are three principal ways in which such scores may be used by supervisors and administrators:

A. Evaluating the Mental Health Status of Single Classes.

A principal, a supervisor, a director of research, or a superintendent often desires to know the mental health status of a single class. This knowledge is often useful in identifying and eliminating the causes of teacher difficulties. It is useful in comparing the status of different classrooms in a single school; such a comparison often enables principals, supervisors, or directors of research to identify the location of desirable mental health practices which can be recommended to others. Such knowledge regarding a particular class often enables a superintendent to identify a particular teacher who may be needed for a particular situation in a classroom elsewhere.

Such information can be obtained by tabulating the scores of all pupils of a class on each of the above thirteen catgories, and composing the median for each category. A simple method of procedure is to obtain the median scores by arranging the pupil scores of each category in order of size and selecting the middle score (or a point midway between th two midmost scores when the number of pupils in the class is even) as the class score in each category. Not only may a given class be compared with other similar classes in this manner, but variations among the mental health categories within single classes may be observed.

2. Evaluating the mental health status of individual schools.

Teacher placement, supervisory schedules, distribution of materials, and other administrative and supervisory problems may often be simplified by a knowl-

edge of the mental health status of a given school as compared with other schools. Such knowledge is also valuable to the principal, curriculum coordinator, or director of research in supervisory problems or research projects. Such evaluations of mental health status for individual schools may be obtained as follows:

B. Evaluating the Mental Health Status of Individual Schools.

(2) Use the median score of each of these thirteen categories as the measure of mental health status of the school.

C. Evaluating the Mental Health Status of Entire School Systems.

Evidence of the mental health status of a school system may be obtained as follows:

(1) Tabulate the median scores for each school on each of the thirteen categories.

(2) Use the median score of each of these thirteen categories as the measure of mental health status of the school system.

Such information permits the superintendent's office to compare the mental health liabilities as a whole with the mental health assets of his school system; with that of others. The norms represent the average and status of pupils in many systems; and it enables him to identify areas in which mental health status is unsatisfactory and thus provides a basis upon which he may plan modifications in educational materials and activities.

If the majority of mental health assets scores for a school or school system are low, it may indicate that the educational procedures in vogue are too formal or traditional and that more informal activities should be undertaken. If scores on mental health health liabilities are too low, it may indicate that the course of study materials are too difficult for the capacities of the learners. Such a situation might well be investigated. Low scores on social participation or inter-personal skills suggest the desirability of more emphasis on aspects of social training, etiquette, and attitude building which, in some school systems, are not regarded as being a part of the regular curriculum. Low scores on satisfying work and recreation or adequate outlook and goals may indicate too little stress on school-community relations and suggest more emphasis on interpreting the activities, needs, and opportunities of the community.

Unsatisfactory school and school district trends revealed by percentile summaries are to be regarded as the points of departure for investigating the need or desirability of modification in the objectives, materials, and procedures of the curriculum.

Teachers, supervisors, and administrators should be alert to the opportunities which are provided in the school environment for setting up stimulating situations that may act as important factors in the improvement of mental health. The school provides many normal situations in which there are opportunities for social interaction, wholesome conflicts and accommodations, applications of social controls, exercise of leadership, and acceptance of responsibilities. These facilities should be inventoried, utilized, and, when necessary, modified to harmonize with such objectives and procedures as are requisite to the development of mentally healthy and effective personalities.

A careful analysis of the available opportunities and their constructive utilization in the problems of mental health is the privilege and opportunity of all who are engaged in conducting the Nation's educational program.

XII. Percentile Norms

The percentile norms provided on the last page of this Manual were obtained by the administration of the Mental Health Analysis—Elementary Series to approximately 1,000 pupils in grades 4-8 in nine separate school districts in three states. In the preparation of these norms it was found that there were no significant differences by sex or grade and that individuals in each group showed variations from very low to high scores in each of the categories.

A percentile may be described as a point on a 100-point scale which indicates the per cent of individuals receiving scores which fall below that particular percentile. For example, a pupil whose score falls at the 30 percentile point equals or exceeds 30 per cent of the pupils on whom the test was standardized; it may also be interpreted to mean that this pupil is lower than 70 per cent of the pupils in the standardization group.

EXAMINER'S MEMORANDA

PERCENTILE NORMS

Percentile:	1	5	10	20	30	40	50	60	70	80	90	95	99
1. Liabilities ..... Score:	0-32	33-40	41-50	51-55	56-60	61-65	66-69	70-73	74-77	78-82	83-87	88-92	93+
A. Behavioral Immaturity	0- 4	5- 6	7- 8	9-10	11	12	13	14	15	16	17	18	19+
B. Emotional Instability.....	0- 2	3- 4	5- 6	7- 8	9-10	11	12	13	14	15-16	17	18	19+
C. Feelings of Inadequacy.....	0- 2	3- 4	5- 6	7- 8	9	10	11	12	13-14	15-16	17	18	19+
D. Physical Defects.....	0- 5	6- 9	10-12	13-14	15	16	17	....	18	....	19	....	20
E. Nervous Manifestations	0- 4	5- 7	8- 9	10-11	12	13	14	15	16	17	18	19	20
2. Assets ..... Score:	0-39	40-52	53-61	62-67	68-71	72-75	76-78	79-81	82-84	85-87	88-92	93-95	96+
A. Close Personal Relationships	0- 7	8-10	11-12	13-14	15	16	17	....	18	....	19	....	20
B. Inter-Personal Skills.....	0- 4	5- 7	8-10	11	12	13	14	15	16	17	18	19	20
C. Social Participation.....	0- 5	6- 8	9-10	11-12	13	14	15	16	17	18	....	19	20
D. Satisfying Work & Recr.....	0- 5	6- 8	9-10	11-12	13	14	15	....	16	17	18	19	20
E. Adequate Outlook & Goals....	0- 6	7- 9	10-11	12	13	14	15	16	...	17	18	19	20
Total ..... Score:	0-74	75-97	98-113	114-125	126-133	134-140	141-147	148-154	155-161	162-169	170-179	180-186	187+
Percentile:	1	5	10	20	30	40	50	60	70	80	90	95	99

PERCENTILE NORMS

DIRECTIONS: To find the percentile value of a liabilities, assets, or total score—locate the score in the corresponding line, and read the percentile in the top or bottom line of large, heavy face numbers. Thus a Total Score of 135 has a percentile value of 40. A Liabilities Score of 86 would have a percentile value of 90; an Assets Score of 78, a percentile value of 50. Use the same method to find the percentile value of a category or sub-section score. A score of 16 on Emotional Instability would have a percentile value of 80. Refer also to description of the Sample Profile on page 7 of this Manual.

FORM Q

Intermediate Test

GRADES 4-6

By

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THE GRAY-VOTAW-ROGERS

GENERAL ACHIEVEMENT TESTS

Name..... Grade..... Boy or Girl.....

Date..... What is your age?.....

When is your next birthday?.....

Name of your town or district.....

Name of your building.....

Test	Score
1. Elemen. Science	
2. Language	
3. Literature	
4. Spelling	
5. Reading: Vocab.	
6. Reading: Comp.	
7. Social Studies	
8. Health & Safety	
9. Arith. Reas.	
10. Arith. Compu.	

10).....

Total Average .....

Educational Grade .....

Educational Age .....

1. The educational grade and age scales on this Profile Chart indicate the norms for this test.
2. Ages above 14-2 and below 8-2 are extrapolated.
3. The short vertical lines are probable errors of the estimated true scores.
4. The scale of scores for all of the tests has been equated. Thus uniform achievement will be indicated for a child if the line connecting his ten score-points is approximately horizontal.

DIRECTIONS printed in manual must be followed in administering this test if the results are to be compared with norms.

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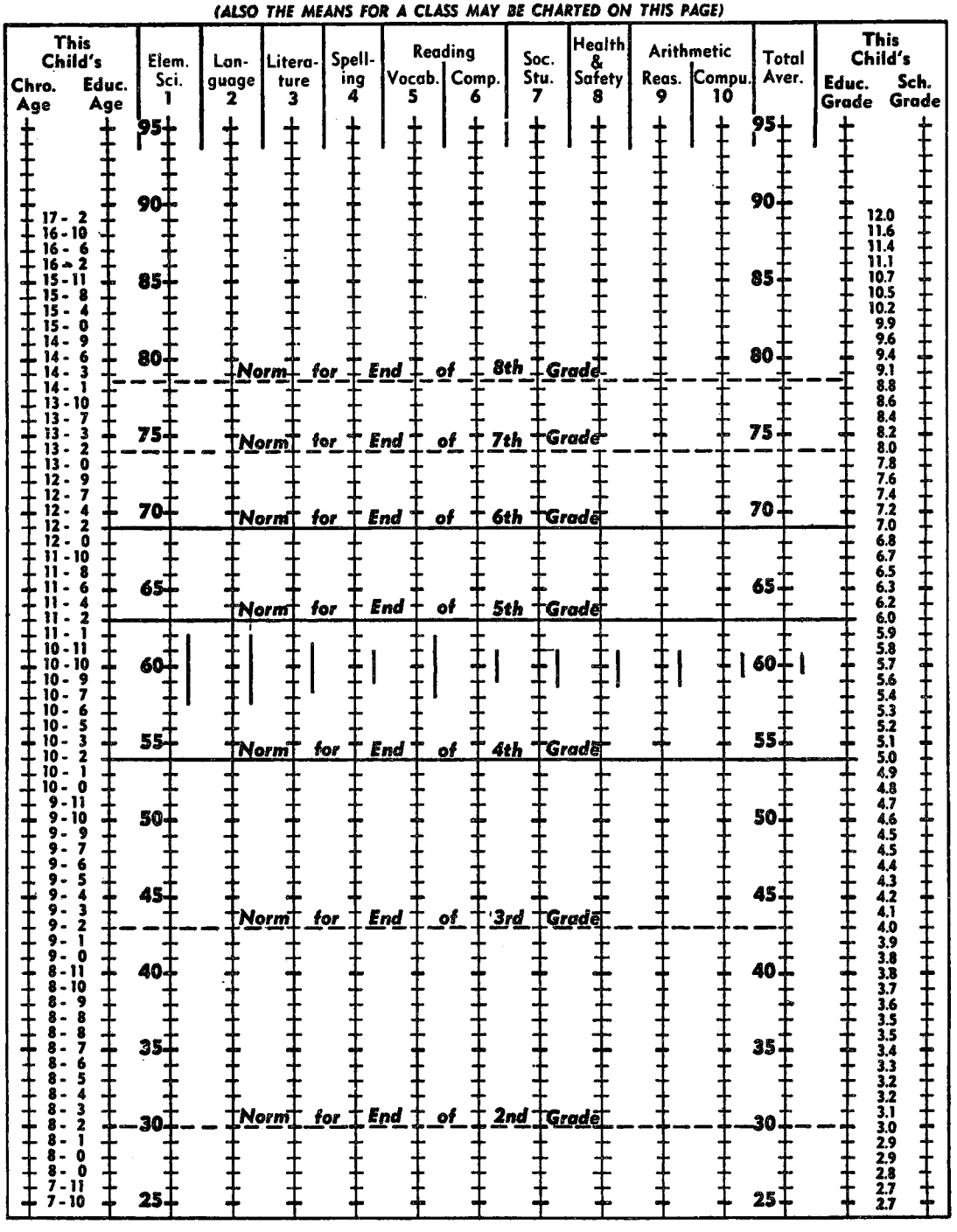
INDIVIDUAL EDUCATIONAL CHART

(ALSO THE MEANS FOR A CLASS MAY BE CHARTED ON THIS PAGE)



TEST 1. ELEMENTARY SCIENCE

DIRECTIONS: **Find the answer that you believe makes the statement true and then place an X in the square at the right that is numbered the same as the answer you choose. Do not skip any of the items.**

EXAMPLE: A turkey is a 1 fish 2 fowl 3 plant. .....

ANSWERS		
1	2	3
☐	☒	☐

	1	2	3
1. Coal is found in 1 the ground 2 oil 3 water.	☐	☐	☐
2. Lumber comes from 1 forests 2 mines 3 prairies.	☐	☐	☐
3. Dye is commonly used to color 1 cloth 2 metal 3 wood.	☐	☐	☐
4. The engine of an automobile is run by 1 steam 2 crude oil 3 gasoline.	☐	☐	☐
5. Earthworms live in 1 water 2 soil 3 rocks.	☐	☐	☐
6. An X-ray machine takes pictures of 1 clouds 2 bones 3 colors.	☐	☐	☐
7. A telephone wire carries 1 electricity 2 light 3 heat.	☐	☐	☐
8. A toadstool is a type of 1 cabbage 2 carrot 3 mushroom.	☐	☐	☐
9. Linen is made from 1 wool 2 flax 3 hair.	☐	☐	☐
10. Grains of pollen fall upon the pistil of a flower to make 1 petals 2 leaves 3 seeds.	☐	☐	☐
11. Linoleum is used to cover the 1 bed 2 yard 3 floor.	☐	☐	☐
12. The earth gets its warmth from the 1 planets 2 moon 3 sun.	☐	☐	☐
13. Starch is the principal food material in 1 eggs 2 potatoes 3 spinach.	☐	☐	☐
14. Wooden furniture can be preserved by the use of 1 sandpaper 2 alcohol 3 varnish.	☐	☐	☐
15. Sponges grow in 1 caves 2 water 3 soil.	☐	☐	☐
16. The rainbow is sunlight refracted by 1 dust 2 raindrops 3 atmosphere.	☐	☐	☐

(GO ON TO NEXT PAGE)

	1	2	3
17. The principal food of song birds is 1 grain 2 insects 3 fruit.	☐	☐	☐
18. The shedding of feathers by birds before growing a new coat is called 1 migrating 2 mating 3 molting.	☐	☐	☐
19. The smallest forms of plant life and animal life are observed through a 1 microscope 2 telescope 3 stereoscope.	☐	☐	☐
20. The main solvent used in the paint industry is 1 ether 2 turpentine 3 carbon.	☐	☐	☐
21. Petroleum is found mostly in 1 Utah 2 Texas 3 Missouri.	☐	☐	☐
22. A liquid used in thermometers is 1 colored water 2 mercury 3 iodine.	☐	☐	☐
23. We breathe to secure 1 oxygen 2 carbon dioxide 3 hydrogen.	☐	☐	☐
24. The treatment of hides to make leather is called 1 tanning 2 skinning 3 dipping.	☐	☐	☐
25. Water becomes hard by dissolving 1 sands 2 gases 3 minerals.	☐	☐	☐
26. Bacteria grow on 1 bright surfaces 2 dirty hands 3 sunny porches.	☐	☐	☐
27. A calendar day begins for a locality at 1 sunrise 2 noon 3 midnight.	☐	☐	☐
28. The rotation of the earth upon its axis causes 1 day and night 2 seasons 3 winds.	☐	☐	☐
29. After the winter is ended, birds usually grow a new coat of feathers that are 1 duller 2 brighter 3 the same color.	☐	☐	☐
30. Coal is formed from 1 buried plants 2 sea shells 3 bones.	☐	☐	☐
31. Lightning is a result of 1 static electricity 2 thunder 3 magnetism.	☐	☐	☐
32. A bat's body is covered with 1 feathers 2 scales 3 hair.	☐	☐	☐
33. A spider has 1 four legs 2 six legs 3 eight legs.	☐	☐	☐
34. The male deer is called a 1 doe 2 buck 3 fawn.	☐	☐	☐

(GO ON TO NEXT PAGE)

	1	2	3
35. The steam engine was invented by 1 Bell 2 Watt 3 Edison.	☐	☐	☐
36. The number of sound vibrations per second which produces high pitch is 1 many 2 medium 3 few.	☐	☐	☐
37. Fertile soil contains an abundance of 1 oxides 2 alkalies 3 humus.	☐	☐	☐
38. Anthracite coal is 1 soft 2 powdered 3 hard.	☐	☐	☐
39. In the spring many birds fly 1 north 2 south 3 west.	☐	☐	☐
40. If a man and a boy are on a seesaw across a fence, the fence will have to be 1 at the center of the seesaw 2 nearer the boy 3 nearer the man.	☐	☐	☐
41. The pendulum is found in 1 clocks 2 compasses 3 meters.	☐	☐	☐
42. Compared with the earth as to size, most stars are 1 smaller 2 larger 3 the same size.	☐	☐	☐
43. Light or heat is absorbed most readily by an object which is painted 1 black 2 gray 3 white.	☐	☐	☐
44. The number of parts of an insect's body is 1 six 2 four 3 three.	☐	☐	☐

No. Right..... *Score*.....

No. right	0–12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Score	24	27	30	34	37	40	44	47	49	51	53	55	56	58	60	62	64	66	68	70	71	73	74	76	78	80	83	85	87	89	91	94	96

TEST 2. LANGUAGE

DIRECTIONS: **If you choose the upper word, phrase, or punctuation marks, place an X in the first square at the right of the page; if you choose the lower, place the X in the second square. Do not skip any of the items.**

EXAMPLES:

a The boys 1 is / 2 are playing ball. ..... ANSWERS: 1 ☐ 2 ☒

b The month of 1 May / 2 may brings flowers. ..... ANSWERS: 1 ☒ 2 ☐

c When did you 1 come. / 2 come? ..... ANSWERS: 1 ☐ 2 ☒

		ANSWERS
1.	Billy's mother 1 doesn't / 2 don't know where he is.	1 ☐ 2 ☐
2.	Spring 1 come / 2 came early this year.	1 ☐ 2 ☐
3.	Tom's friends 1 saw / 2 seen him whitewashing the fence.	1 ☐ 2 ☐
4.	1 May / 2 Can I use your eraser?	1 ☐ 2 ☐
5.	Silver will soon outrun 1 them / 2 those other horses.	1 ☐ 2 ☐
6.	The children in the hospital 1 took / 2 taken special interest in the dolls.	1 ☐ 2 ☐
7.	The captains had already 1 chosen / 2 chose the best spellers.	1 ☐ 2 ☐
8.	There 1 is / 2 are thirty days in September.	1 ☐ 2 ☐
9.	The fourth grade 1 sang / 2 sung as if they enjoyed singing.	1 ☐ 2 ☐
10.	The circus posters show pictures of 1 lions elephants and clowns. / 2 lions, elephants, and clowns.	1 ☐ 2 ☐
11.	I wish I had 1 went / 2 gone to the rodeo.	1 ☐ 2 ☐
12.	It 1 doesn't / 2 don't seem any time since last Christmas.	1 ☐ 2 ☐
13.	Longfellow often read to his daughters what he had 1 wrote. / 2 written.	1 ☐ 2 ☐
14.	1 Her / 2 She and Tom had splendid ideas for games.	1 ☐ 2 ☐
15.	The Lone Ranger has 1 rode / 2 ridden Silver in many parades.	1 ☐ 2 ☐
16.	Just outside my window 1 was / 2 were two robins.	1 ☐ 2 ☐
17.	The lovely bubble 1 burst / 2 bursted when it touched the floor.	1 ☐ 2 ☐
18.	No one likes cake better than 1 I. / 2 me.	1 ☐ 2 ☐

(GO ON TO NEXT PAGE)

		1	2
19.	You (1 weren't / 2 wasn't) supposed to open the book.	☐	☐
20.	The boy scouts have brought (1 their / 2 there) equipment.	☐	☐
21.	Some boys (1 stole / 2 swiped) fruit from Mr. Hardy's orchard.	☐	☐
22.	(1 Us boys / 2 We boys) liked the new pupil.	☐	☐
23	It seemed (1 rather / 2 kind of) queer that no one was at home.	☐	☐
24.	Laura (1 should have / 2 should of) known better.	☐	☐
25.	Every dollar we have (1 gave / 2 given) to the Red Cross has been used wisely.	☐	☐
26.	Margaret Mitchell wrote (1 Gone with the Wind. / 2 "Gone with the Wind.")	☐	☐
27.	Balloting is (1 voting. / 2 when you vote.)	☐	☐
28.	It is (1 sure / 2 surely) kind of you to invite me.	☐	☐
29.	Those boards are a foot (1 to / 2 too) long.	☐	☐
30.	Rip Van Winkle met some queer little (1 men, they / 2 men. They) gave him a drink from their flagons.	☐	☐
31.	Ask Joe what kinds of planes he has (1 flew. / 2 flown.)	☐	☐
32.	A cowboy loves his horse and treats him (1 well. / 2 good.)	☐	☐
33.	It is a good idea to (1 lie / 2 lay) down and rest after dinner.	☐	☐
34.	The people (1 could / 2 couldn't) hardly believe that Arthur should be their king.	☐	☐
35.	If apples are (1 shaken / 2 shook) from the tree, they get bruised.	☐	☐
36.	Jim's sore foot was hurting (1 considerable. / 2 considerably.)	☐	☐
37.	(1 The south / 2 The South) is noted for its hospitality.	☐	☐
38.	Here is a picture of Junius and (1 Julius our / 2 Julius, our) twin calves.	☐	☐
39.	Children should learn to defend (1 theirselves. / 2 themselves.)	☐	☐
40.	The baby thinks (1 its / 2 it's) fun to play in the sandpile.	☐	☐

(GO ON TO NEXT PAGE)

		1	2
41.	Leonard's horse has a (1) lose (2) loose shoe.	☐	☐
42.	Bob would not tell where the ball (1) was. (2) was at.	☐	☐
43.	Margaret, please come (1) in (2) into the house and help me.	☐	☐
44.	I went to the museum with (1) John, and (2) John and Robert took Father for a walk.	☐	☐
45.	The king granted favors to (1) whoever (2) whomever flattered him.	☐	☐
46.	It was (1) they (2) them who captured the bandits.	☐	☐
47.	Sarah's new hat is (1) nice. (2) becoming.	☐	☐
48.	Please mail your answer to Hazel or (1) me. (2) myself.	☐	☐
49.	I (1) advise (2) advice you to study your lesson.	☐	☐
50.	Good citizenship is (1) loyalty (2) when you are loyal to your country.	☐	☐
51.	"It matters not (1) who (2) whom I am," said the stranger.	☐	☐
52.	Anyone who really loves (1) his (2) their country will obey its laws.	☐	☐
53.	You (1) set (2) sat the bowl on the wrong shelf.	☐	☐
54.	A list of twenty names (1) was (2) were written on the blackboard.	☐	☐

No. Right..... *Score*.....

No. right.....	0-21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Score.....	25	28	30	33	36	39	42	44	47	49	51	54	55	57	58	60	61	63	65	67	69	70	72	73	74	76	78	80	82	85	87	89	91	94

TEST 3. LITERATURE

DIRECTIONS: Each sentence has four answers which are numbered 1, 2, 3, and 4, but only one of the answers is correct. Read each sentence carefully and select the answer that you believe to be the correct one. Then place an X in the square at the right that has the same number as the answer you selected. Do not skip any sentences.

ANSWERS

EXAMPLE: Captain Kidd was a famous
1 soldier 2 king 3 pirate 4 writer. ..... | 1 ☐ | 2 ☐ | 3 ☒ | 4 ☐ |

---

1. The three blind mice ran after
1 the piper 2 the farmer's wife 3 Princess Rose 4 the baker. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

2. At Christmas, the shoemaker and his wife gave the elves
1 a tiny cottage 2 a magic nut 3 bright jewels 4 new coats and shoes. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

3. Peter and Barbara Ann Brandon
1 explored an island
2 traveled with a circus
3 visited their uncle's ranches
4 won a tennis tournament. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

4. Lucy Locket lost her 1 slipper 2 ring 3 pocket 4 bonnet. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

5. The wind blew Half-Chick
1 into a tree-top
2 into a ditch
3 to the top of the church steeple
4 to the giant's castle. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

6. *The Fisherman and His Wife* is the story of a woman who was
1 greedy 2 lazy 3 careless 4 generous. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

7. The Owl and the Pussy-Cat
1 went to sea
2 ate each other up
3 climbed the glass hill
4 sailed the skies in a wooden shoe. ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

8. Tom Sawyer's half-brother was named 1 Sidney 2 Jim 3 Joe 4 Walter. | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

9. A man who understood the language of the animals was
1 Dr. Dolittle 2 the Raggedy Man 3 Johnny Appleseed 4 the Pied Piper... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

10. Clement C. Moore wrote
1 *A Visit from Saint Nicholas*
2 *Why the Chimes Rang*
3 *Heidi*
4 *The Wizard of Oz.* ..... | 1 ☐ | 2 ☐ | 3 ☐ | 4 ☐ |

(GO ON TO NEXT PAGE)

11. The Uncle Remus Stories say that the Tar-Baby which caught Brer Rabbit was made by 1 Farmer Brown 2 Brer Fox 3 Brer Possum 4 the Scarecrow. 1 2 3 4 ☐ ☐ ☐ ☐

12. The musical instrument most often associated with Scotland is the 1 harp 2 bagpipe 3 lyre 4 accordion. ..... 1 2 3 4 ☐ ☐ ☐ ☐

13. Huckleberry Finn was a companion of 1 Penrod 2 Hans Brinker 3 Tom Sawyer 4 Jim Hawkins. ..... 1 2 3 4 ☐ ☐ ☐ ☐

14. *Lazy Jack* is somewhat like the story of 1 Goldilocks 2 Drakesbill 3 Rumpelstiltskin 4 Epaminondas. ..... 1 2 3 4 ☐ ☐ ☐ ☐

15. In *The Boy and the Parrot,* Sebastian bought for his mother 1 a churn 2 a plaid shawl 3 a flute 4 a sewing machine. ..... 1 2 3 4 ☐ ☐ ☐ ☐

16. Sunnybank was the home of
1 Washington Irving
2 the Moffat family
3 a collie dog named Lad
4 the Little Colonel. ..... 1 2 3 4 ☐ ☐ ☐ ☐

17. "The cinema" is another name for 1 pottery-making 2 literary criticism 3 motion pictures 4 light opera. ..... 1 2 3 4 ☐ ☐ ☐ ☐

18. A battle between a father and son is the chief incident in
1 *Silas Marner*
2 *Richard Carvel*
3 *The Ancient Mariner*
4 *Sohrab and Rustum.* ..... 1 2 3 4 ☐ ☐ ☐ ☐

19. The word "Pharaoh" suggests 1 India 2 Egypt 3 Assyria 4 Crete. ..... 1 2 3 4 ☐ ☐ ☐ ☐

20. In his poem "Loveliest of Trees," A. E. Housman writes of the 1 maple tree 2 almond tree 3 cherry tree 4 ebony tree. ..... 1 2 3 4 ☐ ☐ ☐ ☐

21. Wynken, Blynken, and Nod talked to
1 a witch on a broom
2 the moon
3 the queen of the fairies
4 the Thanksgiving elf. ..... 1 2 3 4 ☐ ☐ ☐ ☐

22. Toby Tyler spent ten weeks 1 on a whaling boat 2 on a plantation 3 with an Indian tribe 4 with a circus. 1 2 3 4 ☐ ☐ ☐ ☐

23. Flopsy and Mopsy were 1 twin dolls 2 trained seals 3 kittens 4 rabbits. .... 1 2 3 4 ☐ ☐ ☐ ☐

(GO ON TO NEXT PAGE)

24. Tom Sawyer had the unusual experience of
1 going up in a balloon
2 traveling with a circus
3 hearing his own funeral sermon
4 diving for pearls. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

25. When Pelle's new suit was finished, Pelle thanked
1 his mother 2 his two grandmothers 3 the tailor 4 his pet lamb. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

26. *Hans Brinker, or The Silver Skates* tells of life in
1 Sweden 2 Holland 3 Switzerland 4 Denmark. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

27. Flicka's master was 1 Colin 2 Joe 3 Harry 4 Ken. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

28. In the Robin Hood stories, the Curtal Friar was named
1 Much 2 Tuck 3 Wat 4 Lobb. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

29. The Elephant Child was spanked many times because of his
1 bad manners 2 throwing melon rinds about 3 meddlesome ways 4 curiosity. 1 ☐ 2 ☐ 3 ☐ 4 ☐

30. Ferdinand was a young bull who liked to
1 fight 2 travel 3 smell flowers 4 sleep in the daytime. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

31. The legendary hero of the Canadian forests was
1 Pierre Curie
2 the Count of Monte Cristo
3 David Balfour
4 Paul Bunyan. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

32. *The Perfect Tribute* is a story about
1 the first United States flag
2 World War I
3 the Unfinished Symphony
4 Lincoln's Gettysburg address. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

33. The Tin Woodman is a character in
1 *Pinocchio* 2 *Bambi* 3 *The Wizard of Oz* 4 *The Tinder Box.* ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

34. Commander Richard Byrd tells of his flight over the North Pole in
1 *Sky Pilot* 2 *Skyward* 3 *Wings* 4 *Night Flight.* ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

35. Long John Silver's parrot was named
1 Captain Flint 2 Brom Bones 3 Napoleon 4 Pablo. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

36. Howard Pyle is the author of
1 *Book of Pirates* 2 *Rootabaga Stories* 3 *Water Babies* 4 *Tanglewood Tales* 1 ☐ 2 ☐ 3 ☐ 4 ☐

37. Sara Penn moved her family into a 1 barn 2 dug-out 3 schoolhouse 4 box car. 1 ☐ 2 ☐ 3 ☐ 4 ☐

(GO ON TO NEXT PAGE)

38. The Cat That Walked by Himself could make himself at home in the Cave when the woman
1 spoke three words in his praise
2 drove the Dog away
3 put out the fire
4 moved into a hut. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

39. Mrs. Wiggs of the Cabbage Patch gave her three daughters the names of
1 flowers 2 characters in the Bible 3 seasons of the year 4 continents. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

40. Plymouth was the home of
1 Ichabod Crane 2 Miles Standish 3 Paul Revere 4 Rip Van Winkle. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

41. The hero who found the Golden Fleece was
1 Jason 2 Orpheus 3 Hercules 4 Ulysses. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

42. *Cimarron* is the story of the rush for land in
1 California 2 Ohio 3 Nebraska 4 Oklahoma. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

43. The gift Prometheus gave to man was
1 music 2 fire 3 wisdom 4 the seasons. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

44. The wife of Cupid was 1 Persephone 2 Daphne 3 Psyche 4 Alcestis. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

45. The author of *The Red Badge of Courage* is
1 George W. Cable 2 Stephen Crane 3 Daniel Defoe 4 Walter Edmonds. .. 1 ☐ 2 ☐ 3 ☐ 4 ☐

46. Christian and Hopeful are characters in
1 *Gulliver's Travels* 2 *The Pilgrim's Progress* 3 *Ivanhoe* 4 *Robinson Crusoe.* 1 ☐ 2 ☐ 3 ☐ 4 ☐

47. In *Treasure Island,* the treasure-seekers sailed aboard the
1 *Santa Maria* 2 *Admiral Benbow* 3 *Hispaniola* 4 *Triton.* ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

48. Pecos Bill reminds the reader of
1 Ferdinand 2 Dr. Dolittle 3 Buffalo Bill 4 Paul Bunyan. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

49. Harvey Cheyne is a character in
1 *Captains Courageous* 2 *The Spy* 3 *The Yearling* 4 *Wings.* ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

50. The hero of the Medieval Norse legends is
1 Siegfried 2 Roland 3 Arthur 4 Charlemagne. ..... 1 ☐ 2 ☐ 3 ☐ 4 ☐

No. Right..... *Score*.....

No. right	0–7	8	9	10	11	12
Score	28	31	35	38	42	46

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
48	50	53	56	59	61	65	68	70	72	74	76	78	79	80	80	81	82	83	83	84	85	85	86	87	87	88	89	90	90	91	91	92	93	94	94	95	96

TEST 4. SPELLING

TEST 5. READING: VOCABULARY

DIRECTIONS: **Find the answer that you believe makes the statement true and then place an X in the square at the right that is numbered the same as the answer you chose. Do not skip any of the items.**

EXAMPLE: A *lad* is a 1 *girl* 2 *pony* 3 *boy* 4 *kitten.* .....

ANSWERS			
1	2	3	4
☐	☐	☒	☐

	1	2	3	4
1. To be *clean* we must 1 *wash* 2 *work* 3 *laugh* 4 *pull.*	☐	☐	☐	☐
2. *Waves* are seen on 1 *schools* 2 *hats* 3 *water* 4 *gardens.*	☐	☐	☐	☐
3. A *hue* is a 1 *food* 2 *color* 3 *hut* 4 *plan.*	☐	☐	☐	☐
4. A *feast* is a 1 *meal* 2 *race* 3 *giant* 4 *mountain.*	☐	☐	☐	☐
5. A *gift* is a 1 *trip* 2 *number* 3 *present* 4 *drive.*	☐	☐	☐	☐
6. A *library* has 1 *bottles* 2 *books* 3 *horns* 4 *tools.*	☐	☐	☐	☐
7. The *tongue* is used when we 1 *walk* 2 *talk* 3 *write* 4 *sleep.*	☐	☐	☐	☐
8. A *reply* is an 1 *offer* 2 *idea* 3 *answer* 4 *opinion.*	☐	☐	☐	☐
9. A *castle* is a 1 *fence* 2 *house* 3 *lock* 4 *organ.*	☐	☐	☐	☐
10. *Least* means 1 *smallest* 2 *last* 3 *closest* 4 *first.*	☐	☐	☐	☐
11. *Twice* means 1 *before* 2 *double* 3 *often* 4 *seldom.*	☐	☐	☐	☐
12. *Simple* means 1 *silent* 2 *happy* 3 *single* 4 *easy.*	☐	☐	☐	☐
13. To *stare* is to 1 *fear* 2 *look* 3 *like* 4 *hunt.*	☐	☐	☐	☐
14. A *university* is a 1 *ray* 2 *school* 3 *realm* 4 *pearl.*	☐	☐	☐	☐
15. *Brilliant* means 1 *sparkling* 2 *spacious* 3 *noisy* 4 *bushy.*	☐	☐	☐	☐
16. To *spy* is to 1 *catch* 2 *arrest* 3 *watch* 4 *report.*	☐	☐	☐	☐
17. An *idea* is a 1 *picture* 2 *thought* 3 *story* 4 *knight.*	☐	☐	☐	☐
18. *Fuel* produces 1 *heat* 2 *famine* 3 *tides* 4 *disease.*	☐	☐	☐	☐
19. *Pork* comes from 1 *sheep* 2 *goats* 3 *hogs* 4 *cows.*	☐	☐	☐	☐

(GO ON TO NEXT PAGE)

		1	2	3	4
20.	*Grief* makes us 1 *sad* 2 *great* 3 *dull* 4 *foolish.*	☐	☐	☐	☐
21.	*Rage* refers to 1 *fever* 2 *laughter* 3 *records* 4 *anger.*	☐	☐	☐	☐
22.	To *decay* is to 1 *rot* 2 *refuse* 3 *renew* 4 *register.*	☐	☐	☐	☐
23.	To *exalt* is to 1 *praise* 2 *explain* 3 *fear* 4 *heed.*	☐	☐	☐	☐
24.	*Ancient* means 1 *high* 2 *large* 3 *dark* 4 *old.*	☐	☐	☐	☐
25.	To *interrupt* is to 1 *distrust* 2 *help* 3 *join* 4 *hinder.*	☐	☐	☐	☐
26.	A *mansion* is a kind of 1 *family* 2 *residence* 3 *tribe* 4 *mountain.*	☐	☐	☐	☐
27.	*Aged* means 1 *alike* 2 *empty* 3 *old* 4 *decayed.*	☐	☐	☐	☐
28.	A *dungeon* is a kind of 1 *burglar* 2 *bureau* 3 *prison* 4 *servant.*	☐	☐	☐	☐
29.	*Weary* means 1 *bare* 2 *weak* 3 *restless* 4 *tired.*	☐	☐	☐	☐
30.	*Vivid* means 1 *visible* 2 *bright* 3 *thoughtful* 4 *respectful.*	☐	☐	☐	☐
31.	To *explore* is to 1 *enter* 2 *examine* 3 *envy* 4 *reap.*	☐	☐	☐	☐
32.	*Quality* refers to 1 *excellence* 2 *pride* 3 *might* 4 *strength.*	☐	☐	☐	☐
33.	To *reprove* is to 1 *restrain* 2 *separate* 3 *blame* 4 *revise.*	☐	☐	☐	☐
34.	An *opportunity* is a 1 *falsehood* 2 *dragon* 3 *chance* 4 *fort.*	☐	☐	☐	☐
35.	A *license* is a 1 *loan* 2 *gale* 3 *store* 4 *permit.*	☐	☐	☐	☐
36.	*Crimson* is a 1 *color* 2 *salad* 3 *flower* 4 *crystal.*	☐	☐	☐	☐
37.	A *melody* is a 1 *chest* 2 *tune* 3 *flake* 4 *film.*	☐	☐	☐	☐
38.	*Severe* means 1 *humble* 2 *serene* 3 *sacred* 4 *stern.*	☐	☐	☐	☐
39.	*Sufficient* means 1 *equal* 2 *lean* 3 *enough* 4 *lavish.*	☐	☐	☐	☐
40.	*Artificial* means 1 *unreal* 2 *attractive* 3 *liberal* 4 *conscious.*	☐	☐	☐	☐
41.	*Brisk* means 1 *stately* 2 *thirsty* 3 *lowly* 4 *lively.*	☐	☐	☐	☐

(GO ON TO NEXT PAGE)

		1	2	3	4
42.	An *obstacle* is a 1 *basin* 2 *mob* 3 *barrier* 4 *driveway.*	☐	☐	☐	☐
43.	An *utterance* is 1 *bought* 2 *spoken* 3 *carried* 4 *fancied.*	☐	☐	☐	☐
44.	A *citron* is a 1 *fruit* 2 *tank* 3 *ravine* 4 *fugitive.*	☐	☐	☐	☐
45.	*Dismal* means 1 *dirty* 2 *loyal* 3 *pale* 4 *gloomy.*	☐	☐	☐	☐
46.	An *abode* is a 1 *mine* 2 *factory* 3 *dwelling* 4 *voyage.*	☐	☐	☐	☐
47.	To *avoid* means to 1 *tread* 2 *bribe* 3 *worry* 4 *shun.*	☐	☐	☐	☐
48.	*Mute* means 1 *naked* 2 *musical* 3 *kindly* 4 *silent.*	☐	☐	☐	☐
49.	To *expose* is to 1 *discover* 2 *direct* 3 *fade* 4 *disclose.*	☐	☐	☐	☐
50.	A *dynamo* is a 1 *dynasty* 2 *crater* 3 *bomb* 4 *machine.*	☐	☐	☐	☐
51.	To *transmit* is to 1 *traverse* 2 *send* 3 *slash* 4 *reclaim.*	☐	☐	☐	☐
52.	*Vigilant* means 1 *watchful* 2 *victorious* 3 *unworthy* 4 *valiant.*	☐	☐	☐	☐
53.	*Verdant* means 1 *green* 2 *pure* 3 *realistic* 4 *vertical.*	☐	☐	☐	☐
54.	To *bequeath* is to 1 *beseech* 2 *assert* 3 *will* 4 *attach.*	☐	☐	☐	☐

No. Right..... *Score*.....

No. right	0–9	10	11	12	13	14	15	16
Score	26	28	31	34	36	39	42	45

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
46	48	50	51	52	54	55	56	57	58	59	60	61	62	63	65	67	69	70	71	72	73	74	75	76	78	79	80	81	82	83	84	85	87	88	89	90	91

TEST 6. READING: COMPREHENSION

DIRECTIONS: **This test consists of several stories or passages. Each story or passage is followed by a few statements. Read the story or passage first. Then in each statement find the answer that makes the statement true and place an X in the square at the right that is numbered the same as the answer you chose. You will save time if you can select the right answers after having read the story or passage once. But you may look at the story or passage again if you need to do so in selecting the right answers. Do not skip any of the items.**

EXAMPLE: Bob has a kitten, a puppy, and a rabbit. He feeds his kitten milk, his puppy meat scraps, and his rabbit carrots.

	ANSWERS		
	1	2	3
a. Bob has 1 one pet 2 two pets 3 three pets.	☐	☐	☒
b. He feeds meat scraps to his 1 kitten 2 puppy 3 rabbit.	☐	☒	☐

I

Bob's pets did not like the same things to eat. Bob fed meat to Spot. He gave carrots to Bunny. Fluff said, "Mew, mew, I want my bowl of milk."

	1	2	3
1. The dog's name was 1 Spot 2 Bob 3 Bunny.	☐	☐	☐
2. The rabbit liked 1 milk 2 carrots 3 meat.	☐	☐	☐
3. Fluff was a 1 puppy 2 pony 3 kitten.	☐	☐	☐

II

Snuff is our cat. The fur on his back is red like gold. His chest and feet are white. Snuff is very smart. He says "Mew, mew," when he wants his dinner. He sleeps on the best chairs. When we go to bed at night we do not put Snuff out. He stays in the house until he wants out and then he unfastens the latch on the window screen with his paw and jumps out.

	1	2	3
4. Our cat's name is 1 Tabby 2 Snuff 3 Puss.	☐	☐	☐
5. His paws are 1 red 2 black 3 white.	☐	☐	☐
6. Our cat sleeps on a 1 chair 2 bed 3 rug.	☐	☐	☐
7. When he wants out he 1 says "Mew, mew" 2 opens a door 3 opens a window screen.	☐	☐	☐
8. His back is 1 red 2 black 3 white.	☐	☐	☐
9. He unfastens the latch with his 1 nose 2 paw 3 tail.	☐	☐	☐

(GO ON TO NEXT PAGE)

III

Caleb was half glad and half sorry that the long journey by covered wagon was ending without even a glimpse of an Indian. It seemed queer, as he and his sister Jane looked across the wide, flat prairie, to hear Father say, "Well, children, here is your new home," for no house was in sight.

Mother's first remark was, "Blossom should give us plenty of milk with so much good grass to eat."

Jane whispered to Caleb, "Do you think Cappy will be lonely with no other kitten to play with?"

10. Caleb and his family traveled to their new home by 1 boat 2 train 3 wagon.	1 ☐	2 ☐	3 ☐
11. Their house was 1 not begun 2 half built 3 ready to be lived in.	1 ☐	2 ☐	3 ☐
12. They would live 1 near the ocean 2 on the prairie 3 in the hills.	1 ☐	2 ☐	3 ☐
13. The cow was named 1 Blossom 2 Daisy 3 Cappy.	1 ☐	2 ☐	3 ☐

IV

Fred Wilson is older than his brother Roy. Fred is three grades above Roy, who is in the second grade. When the boys start to school each morning, Fred's dog Spot goes with them as far as the bus stop.

14. Spot belongs to 1 Mr. Wilson 2 Roy 3 Fred.	1 ☐	2 ☐	3 ☐
15. Fred is in the 1 fifth grade 2 third grade 3 first grade.	1 ☐	2 ☐	3 ☐
16. Each morning Spot goes to 1 school 2 the bus stop 3 the store.	1 ☐	2 ☐	3 ☐

V

Robert E. Lee School bought a new flag. To pay for it, each of the ten homerooms chose one pupil to sell ten tickets, at ten cents each. The child who sold his tickets and turned in the dollar first was allowed to raise the flag. How proud Ralph was as he pulled the cord and watched the silken banner, with its stars and stripes, unfurl!

17. The school bought a 1 state flag 2 school banner 3 United States flag.	1 ☐	2 ☐	3 ☐
18. The flag cost 1 five dollars 2 ten dollars 3 twenty dollars.	1 ☐	2 ☐	3 ☐
19. The flag was raised by 1 a boy 2 a girl 3 the principal.	1 ☐	2 ☐	3 ☐
20. The flag was made of 1 wool 2 cotton 3 silk.	1 ☐	2 ☐	3 ☐
21. The tickets were sold by 1 one pupil 2 five pupils 3 ten pupils.	1 ☐	2 ☐	3 ☐

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VI

Little Deerfoot was an Indian boy. His family belonged to a tribe of Plains Indians. His winter home was a tepee. The tribe migrated in the winter, and tepees were easily moved. Little Deerfoot was happiest in his summer home, an earth lodge, built by his mother and other women of the tribe. The lodge was a cool place even when the summer sun beat down on the hot, dusty plains.

22. A tepee was Deerfoot's winter home, because it was
1 warm 2 large 3 easily moved..... 1 ☐ 2 ☐ 3 ☐

23. The summer homes were built by the Indian
1 braves 2 women 3 children. ..... 1 ☐ 2 ☐ 3 ☐

24. In the winter the Plains Indians
1 migrated 2 hunted 3 built earth lodges. ..... 1 ☐ 2 ☐ 3 ☐

25. Little Deerfoot's favorite home was the
1 earth lodge 2 tepee 3 pueblo. ..... 1 ☐ 2 ☐ 3 ☐

VII

Ulysses and his men were shipwrecked on the island of Polyphemus, a cruel one-eyed giant, who imprisoned his captives in a cave where he kept his sheep at night. The prisoners escaped because their leader was a very crafty man. He put out the giant's eye with a heated rod. The sailors went unseen from the cave in the morning when Polyphemus turned his sheep out to graze.

26. Ulysses was 1 one-eyed 2 cruel 3 crafty. ..... 1 ☐ 2 ☐ 3 ☐

27. Polyphemus was 1 captured 2 blinded 3 shipwrecked. ..... 1 ☐ 2 ☐ 3 ☐

28. The sailors were imprisoned in a 1 cave 2 tower 3 ship. ..... 1 ☐ 2 ☐ 3 ☐

29. The giant was a 1 sailor 2 shepherd 3 wrestler. ..... 1 ☐ 2 ☐ 3 ☐

VIII

Many years ago large numbers of our American people lived in rural areas. In those days families produced their food and apparel on their farms. The shift of population to cities was a result of industrial developments and transportation which, in turn, were made possible by numerous basic inventions during the early nineteenth century. These developments have enabled a smaller proportion of the population to provide farm products for the whole nation.

30. The industrial revolution caused
1 urban growth 2 inventions 3 rural growth. ..... 1 ☐ 2 ☐ 3 ☐

31. The period of basic inventions was about
1 1701 to 1740 2 1801 to 1840 3 1901 to 1940. ..... 1 ☐ 2 ☐ 3 ☐

32. The farmer of the present time as compared with the farmer of the early days is able to produce 1 more 2 less 3 the same amount. ..... 1 ☐ 2 ☐ 3 ☐

No. Right..... *Score*.....

No. right	0–9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Score	28	30	33	36	39	42	45	47	48	50	52	53	55	58	60	62	65	70	73	76	80	85	90	95

TEST 7. SOCIAL STUDIES

DIRECTIONS: Find the answer that you believe makes the statement true and then place an X in the square at the right that is numbered the same as the answer you choose. Do not skip any of the items.

EXAMPLE: The capital of the United States is
1 Denver 2 Washington 3 Chicago 4 Atlanta. .....

ANSWERS			
1	2	3	4
☐	☒	☐	☐

	1	2	3	4
1. Tallow was used in making 1 thread 2 matches 3 buttons 4 candles.	☐	☐	☐	☐
2. Goods are made by machines in a 1 factory 2 studio 3 library 4 warehouse.	☐	☐	☐	☐
3. "The tulip land" is a name which might be used to describe 1 Holland 2 Norway 3 Switzerland 4 Greece.	☐	☐	☐	☐
4. Camels are used for carrying loads in the 1 desert 2 mountains 3 snow 4 jungle.	☐	☐	☐	☐
5. The people of China drink much 1 reindeer milk 2 coffee 3 orange juice 4 tea.	☐	☐	☐	☐
6. Genoa, Italy, was the birthplace of 1 Julius Caesar 2 Madame Curie 3 Christopher Columbus 4 Hernando Cortez.	☐	☐	☐	☐
7. A waterway made by man is a 1 strait 2 bay 3 sound 4 canal.	☐	☐	☐	☐
8. A forge and an anvil suggest a 1 coal miner 2 blacksmith 3 meat packer 4 merchant.	☐	☐	☐	☐
9. Feathers are placed on an arrow to make it 1 look pretty 2 fly far 3 fly straight 4 kill an animal.	☐	☐	☐	☐
10. A great river made of ice and snow is called 1 an oasis 2 a glacier 3 an avalanche 4 a volcano.	☐	☐	☐	☐
11. Dikes are 1 lace-making machines 2 sea walls 3 fishing boats 4 lands of nobles.	☐	☐	☐	☐
12. William Tell is a national hero in 1 Sweden 2 Bavaria 3 Austria 4 Switzerland.	☐	☐	☐	☐
13. A pulley is used for 1 lifting heavy loads 2 breaking wood apart 3 grinding grain 4 polishing steel.	☐	☐	☐	☐
14. One of the American Indian tribes was named the 1 Moabites 2 Hessians 3 Apaches 4 Caledonians.	☐	☐	☐	☐

(GO ON TO NEXT PAGE)

15. During World War II, the head of the government of the Soviet Union was
1 Leon Trotsky 2 Count Leo Tolstoy 3 Nikolay Lenin 4 Joseph Stalin. .... 1 2 3 4 ☐ ☐ ☐ ☐

16. Samoset and Squanto were
1 twin peaks 2 river gods 3 friendly Indians 4 mountain lakes. ..... 1 2 3 4 ☐ ☐ ☐ ☐

17. David Crockett was
1 an English knight
2 a singer
3 an American frontiersman
4 an inventor. ..... 1 2 3 4 ☐ ☐ ☐ ☐

18. The land which a river has made at its mouth is called
1 an oasis 2 a delta 3 an isthmus 4 a peninsula. ..... 1 2 3 4 ☐ ☐ ☐ ☐

19. Boulder Dam controls the wild current of the
1 Colorado River 2 Brazos River 3 Tennessee River 4 Arkansas River. .... 1 2 3 4 ☐ ☐ ☐ ☐

20. In traveling from Delaware to Kansas, a person would go
1 north 2 east 3 south 4 west. ..... 1 2 3 4 ☐ ☐ ☐ ☐

21. "The Sugar Islands" would be a good name for
1 the Aleutians 2 Hawaii 3 Midway Islands 4 Samoa Islands. ..... 1 2 3 4 ☐ ☐ ☐ ☐

22. One of Benjamin Franklin's helpful inventions was a
1 music box 2 stove 3 tractor 4 sewing machine. ..... 1 2 3 4 ☐ ☐ ☐ ☐

23. An important product of Central America is
1 asbestos 2 ivory 3 bananas 4 grain. ..... 1 2 3 4 ☐ ☐ ☐ ☐

24. George Washington's burial place is
1 Westminster Abbey
2 Arlington Cemetery
3 Richmond
4 Mount Vernon. ..... 1 2 3 4 ☐ ☐ ☐ ☐

25. The most important means of transporting goods in the United States is by
1 railroads 2 airplanes 3 river boats 4 trucks. ..... 1 2 3 4 ☐ ☐ ☐ ☐

26. Fujiyama is 1 a city 2 a volcano 3 a religion 4 an artist. ..... 1 2 3 4 ☐ ☐ ☐ ☐

27. In traveling by plane from Chicago to Alaska, a person would fly across
1 Panama 2 Canada 3 Gulf of Mexico 4 Australia. ..... 1 2 3 4 ☐ ☐ ☐ ☐

28. Long Island is a part of the state of
1 Rhode Island 2 Michigan 3 Delaware 4 New York. ..... 1 2 3 4 ☐ ☐ ☐ ☐

29. A forage crop is 1 tomatoes 2 squash 3 alfalfa 4 peppers. ..... 1 2 3 4 ☐ ☐ ☐ ☐

30. In the territory owned by the United States, the point closest to Russia is in
1 Florida 2 Oregon 3 Alaska 4 California ..... 1 2 3 4 ☐ ☐ ☐ ☐

31. The Appalachian Mountains are near the
1 Pacific Ocean 2 Great Salt Lake 3 Atlantic Ocean 4 Gulf of Mexico. .... 1 2 3 4 ☐ ☐ ☐ ☐

32. In the early days a smith was a 1 chief 2 hunter 3 metalworker 4 tanner. 1 2 3 4 ☐ ☐ ☐ ☐

(GO ON TO NEXT PAGE)

33. The sea whose name means "in the midst of land" is the
1 Baltic 2 Mediterranean 3 Adriatic 4 Ægean. ..... 1 2 3 4 ☐ ☐ ☐ ☐

34. The Boston Tea Party was a
1 pledge of peace with the Indians
2 protest against a tax
3 celebration of the return of the Mayflower
4 party for the English king. ..... 1 2 3 4 ☐ ☐ ☐ ☐

35. The swampy region in Florida is known as the
1 Piedmont 2 Bayou 3 Klondike 4 Everglades. ..... 1 2 3 4 ☐ ☐ ☐ ☐

36. The capitol of Cuba is 1 Havana 2 Manila 3 Honolulu 4 San Juan. ..... 1 2 3 4 ☐ ☐ ☐ ☐

37. Famine results from a scarcity of 1 fuel 2 work 3 food 4 clothing. ..... 1 2 3 4 ☐ ☐ ☐ ☐

38. La Guardia Airport is in
1 Chicago 2 New York 3 Philadelphia 4 Los Angeles. ..... 1 2 3 4 ☐ ☐ ☐ ☐

39. The colony of Rhode Island was started by
1 James Oglethorpe
2 Peter Stuyvesant
3 Roger Williams
4 Thomas Hooker. ..... 1 2 3 4 ☐ ☐ ☐ ☐

40. The pyramids were built as
1 burial places
2 forts for protection
3 look-out towers
4 temples for worship. ..... 1 2 3 4 ☐ ☐ ☐ ☐

41. The Imperial Valley is a rich farming section in
1 Iowa 2 Missouri 3 Georgia 4 California. ..... 1 2 3 4 ☐ ☐ ☐ ☐

42. Coolies are to be found in 1 China 2 Arabia 3 Canada 4 Cuba. ..... 1 2 3 4 ☐ ☐ ☐ ☐

43. In traveling from Denver to St. Louis, a person would go
1 east 2 south 3 west 4 north. ..... 1 2 3 4 ☐ ☐ ☐ ☐

44. A rajah is
1 an elephant trainer
2 a worker in ivory
3 a prophet
4 a native prince of India. ..... 1 2 3 4 ☐ ☐ ☐ ☐

45. The search for the seven cities of gold led to the discovery of the Grand Canyon of the Colorado River by 1 Coronado 2 Pizarro 3 Cabot 4 Cortez. ..... 1 2 3 4 ☐ ☐ ☐ ☐

46. Pure metal does not make good money because it is too
1 valuable 2 soft 3 heavy 4 hard..... 1 2 3 4 ☐ ☐ ☐ ☐

47. Turpentine is derived from 1 coal 2 crude oil 3 camphor trees 4 pine trees. 1 2 3 4 ☐ ☐ ☐ ☐

48. The Christ of the Andes is a 1 book 2 church 3 song 4 statue. ..... 1 2 3 4 ☐ ☐ ☐ ☐

(GO ON TO NEXT PAGE)

49. Australia is unusual because of its
1 dense population
2 strange and varied plant and animal life
3 coffee plantations
4 industrial development. .....

50. A wise use of natural resources is called
1 conservation 2 erosion 3 proration 4 rationing. .....

51. An excellent harbor is found in
1 Winnipeg 2 Halifax 3 Edmonton 4 Regina. .....

52. *Anthracite* and *bituminous* are the names of two kinds of
1 stone 2 coal 3 wheat 4 tobacco. .....

53. The settler who discovered that tobacco would grow well in Virginia was
1 John Rolfe 2 Captain John Smith 3 Captain Newport 4 Sir Walter Raleigh.

54. The distance across the United States, from coast to coast, is about
1 1,000 miles 2 2,000 miles 3 3,000 miles 4 10,000 miles. .....

55. The river that is most important in the lives of the Russian people is the
1 Dneiper 2 Don 3 Lena 4 Volga. .....

56. The first Negro slaves were brought to America in 1619 by
1 the Portuguese 2 the French 3 the Italians 4 the Dutch. .....

57. "Thar she blows" was a welcome statement to men who were
1 getting water from windmills
2 blasting tree stumps
3 fishing for whales
4 exploring volcanoes. .....

58. The Union Jack is another name for
1 the British flag
2 England's colonial empire
3 the Parliament buildings
4 the Great Seal of England. .....

59. The first state to ratify the Constitution of the United States was
1 New York 2 Virginia 3 Delaware 4 Massachusetts. .....

60. When George Washington was inaugurated as President, the capital of the nation was 1 Boston 2 Washington, D.C. 3 New York City 4 Philadelphia.

	1	2	3	4
49	☐	☐	☐	☐
50	☐	☐	☐	☐
51	☐	☐	☐	☐
52	☐	☐	☐	☐
53	☐	☐	☐	☐
54	☐	☐	☐	☐
55	☐	☐	☐	☐
56	☐	☐	☐	☐
57	☐	☐	☐	☐
58	☐	☐	☐	☐
59	☐	☐	☐	☐
60	☐	☐	☐	☐

No. Right..... *Score*.....

No. right	0–7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Score	28	30	31	33	35	36	38	40	42	44	46	48	50	51	53	55

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
57	59	61	63	64	65	66	68	69	70	71	72	74	75	76	77	78	79	80	81	82	83	83	84	85	85	86	87	88	88	89	90	91	91	92	93	94	95

TEST 8. HEALTH AND SAFETY

DIRECTIONS: Find the answer that you believe makes the statement true and then place an X in the square at the right that is numbered the same as the answer you choose. Do not skip any of the items.

ANSWERS

EXAMPLE: A drink that builds body tissue is
1 coffee 2 tea 3 milk 4 ginger ale. .....

1	2	3	4
☐	☐	☒	☐

---

1. The best material for a child's school shoes is
1 canvas 2 rubber 3 wool felt 4 leather. .....

1	2	3	4
☐	☐	☐	☐

2. Children should never drink 1 cocoa 2 coffee 3 prune juice 4 malted milk. ....

1	2	3	4
☐	☐	☐	☐

3. The best way to keep food from spoiling is to keep it
1 covered 2 warm 3 dry 4 cold. .....

1	2	3	4
☐	☐	☐	☐

4. Sweets should be eaten
1 between meals
2 at the end of a meal
3 at bedtime
4 only in cold weather. .....

1	2	3	4
☐	☐	☐	☐

5. The best way to prevent accidents is to
1 stay at home
2 stay off skates and bicycles
3 hear talks on safety
4 observe safety rules. .....

1	2	3	4
☐	☐	☐	☐

6. A safe place to play is a 1 fenced yard 2 sandbank 3 gravel pit 4 haymow.

1	2	3	4
☐	☐	☐	☐

7. Splints and casts are used in the treatment of
1 cuts 2 bruises 3 broken bones 4 skin diseases. .....

1	2	3	4
☐	☐	☐	☐

8. The skull protects the 1 heart 2 brain 3 scalp 4 throat. .....

1	2	3	4
☐	☐	☐	☐

9. Houses have screens to keep out 1 dust 2 germs 3 heat 4 insects. .....

1	2	3	4
☐	☐	☐	☐

10. The Eskimos' diet contains much 1 sugar 2 starch 3 fat 4 minerals. .....

1	2	3	4
☐	☐	☐	☐

11. Pores are found in the 1 bones 2 nerves 3 teeth 4 skin. .....

1	2	3	4
☐	☐	☐	☐

12. A knowledge of first aid is useful in case of
1 bad colds 2 headaches 3 accidental injuries 4 sore throat. .....

1	2	3	4
☐	☐	☐	☐

13. A person should never touch an electric light switch if he is
1 wearing wool clothing
2 chewing gum
3 standing on a rubber mat
4 standing in water. .....

1	2	3	4
☐	☐	☐	☐

(GO ON TO NEXT PAGE)

14. A part of your home that is important to your health is the
1 rugs 2 screens 3 wallpaper 4 curtains. ..... 1 2 3 4 ☐ ☐ ☐ ☐

15. Milk is safer to drink after it has been
1 evaporated 2 homogenized 3 diluted 4 pasteurized. ..... 1 2 3 4 ☐ ☐ ☐ ☐

16. The most healthful cereals are
1 toasted 2 white 3 made from corn 4 whole-grain. ..... 1 2 3 4 ☐ ☐ ☐ ☐

17. An important safety rule for those who ride in a bus is
1 wait at regular bus stops
2 do not drop wastepaper in the bus
3 keep head and hands inside the windows
4 be courteous to the driver ..... 1 2 3 4 ☐ ☐ ☐ ☐

18. It is dangerous to start a fire with
1 newspapers 2 pine kindling 3 leaves and brush 4 kerosene. ..... 1 2 3 4 ☐ ☐ ☐ ☐

19. "Polio" is a name popularly used for
1 infantile paralysis 2 bronchitis 3 leukemia 4 anemia. ..... 1 2 3 4 ☐ ☐ ☐ ☐

20. It is dangerous to clean clothes at home with
1 sponges 2 absorbing blotters 3 water and soap 4 gasoline. ..... 1 2 3 4 ☐ ☐ ☐ ☐

21. When driving a car in the city limits, a person should not go faster than
1 ten miles per hour
2 fifteen miles per hour
3 thirty miles per hour
4 fifty miles per hour. ..... 1 2 3 4 ☐ ☐ ☐ ☐

22. A large amount of fuel food is needed by a
1 woodcutter 2 telephone operator 3 teacher 4 barber. ..... 1 2 3 4 ☐ ☐ ☐ ☐

23. A good thing to put on a cut or scratched finger is
1 a very tight bandage 2 vaseline 3 ice water 4 tincture of merthiolate. ..... 1 2 3 4 ☐ ☐ ☐ ☐

24. Protein is a 1 food substance 2 drug 3 gland secretion 4 disease. ..... 1 2 3 4 ☐ ☐ ☐ ☐

25. The safest place to ride a bicycle is
1 on the sidewalk
2 hitched on an automobile
3 near the curb
4 in the middle of the street. ..... 1 2 3 4 ☐ ☐ ☐ ☐

26. An object which is sterile is free from 1 color 2 odor 3 germs 4 moisture. 1 2 3 4 ☐ ☐ ☐ ☐

27. If you are not certain of the purity of drinking water, you should
1 salt it 2 boil it 3 chill it 4 drink only a little of it. ..... 1 2 3 4 ☐ ☐ ☐ ☐

28. The thickening of the blood outside the body is called
1 contraction 2 clotting 3 transfusion 4 fumigation. ..... 1 2 3 4 ☐ ☐ ☐ ☐

29. A dog pants because he cannot 1 cough 2 bark 3 sweat 4 eat. ..... 1 2 3 4 ☐ ☐ ☐ ☐

(GO ON TO NEXT PAGE)

30. The School Safety Patrol may be seen on duty at
1 fires 2 street crossing 3 libraries 4 ball games. ..... 1 2 3 4 ☐ ☐ ☐ ☐

31. A special treatment for infantile paralysis was introduced by
1 Sister Kenny 2 Louis Pasteur 3 Clara Barton 4 Edward Jenner. ..... 1 2 3 4 ☐ ☐ ☐ ☐

32. Members of the 4-H Clubs are
1 great athletes 2 crippled children 3 farm boys and girls 4 expert swimmers. 1 2 3 4 ☐ ☐ ☐ ☐

33. Plasma is found in the 1 blood 2 air 3 digestive juices 4 teeth. ..... 1 2 3 4 ☐ ☐ ☐ ☐

34. A person's ability to see and to think is less than normal when he has drunk
1 alcohol 2 tea 3 coffee 4 cola drinks. ..... 1 2 3 4 ☐ ☐ ☐ ☐

35. The abdomen contains the
1 heart and lungs 2 intestines 3 sense organs 4 spinal column. ..... 1 2 3 4 ☐ ☐ ☐ ☐

36. Artificial respiration should be applied to a person who has
1 become overheated 2 been burned 3 stopped breathing 4 lost blood. ..... 1 2 3 4 ☐ ☐ ☐ ☐

37. The palate aids in 1 walking 2 seeing 3 chewing 4 speaking. ..... 1 2 3 4 ☐ ☐ ☐ ☐

38. A disinfectant is useful in
1 cleaning garbage cans 2 brushing teeth 3 washing hair 4 preparing meals. 1 2 3 4 ☐ ☐ ☐ ☐

39. A school that has good sanitation has
1 clean toilets
2 a good heating system
3 well-trained teachers
4 a school nurse. ..... 1 2 3 4 ☐ ☐ ☐ ☐

40. To prevent fainting, one should
1 drink water 2 walk fast 3 lower his head 4 eat salt. ..... 1 2 3 4 ☐ ☐ ☐ ☐

41. Swelling of the salivary glands is a symptom of
1 food poisoning 2 mumps 3 anemia 4 indigestion. ..... 1 2 3 4 ☐ ☐ ☐ ☐

42. The heat of the body is regulated mostly by the
1 breathing 2 digestion 3 skin 4 glands. ..... 1 2 3 4 ☐ ☐ ☐ ☐

43. A highly contagious skin disease is
1 hives 2 impetigo 3 nettle rash 4 eczema. ..... 1 2 3 4 ☐ ☐ ☐ ☐

44. The vertebrae are 1 bones 2 blood vessels 3 muscles 4 air passages. ..... 1 2 3 4 ☐ ☐ ☐ ☐

No. Right..... *Score*.....

No. right	0–8
Score	26

9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
29	32	35	37	40	43	45	47	48	50	52	54	55	57	59	61	63	64	65	65	66	67	68	69	70	72	74	75	77	79	82	85	87	90	93	95

TEST 9. ARITHMETIC REASONING

DIRECTIONS: Find the answers as quickly as possible. Be sure to write each answer in the space provided for it at the right-hand margin of the page.

ANSWERS

1. Mary has 9 pennies in her blue purse and 5 pennies in her red purse. How many pennies has she in all? 1 .....

2. Ralph has $79 and his sister has $43. Ralph has how much more than his sister? 2 $.....

3. Mr. Smith gave each of his three horses 7 ears of corn. How many ears of corn in all did he give the horses? 3 .....

4. There are 16 children at Donald's party and 9 of them are boys. How many girls are at the party? 4 .....

5. John had $124 in the bank. He then sold his fat pig for $43 and earned $26 helping his father. When all of this was put in the bank, how much did John have in the bank? 5 $.....

6. If one yard is sawed off the end of an 8-foot board, how many feet long is the part that remains? 6 .....ft.

7. How many candy sticks can be bought for 25¢ if they sell at 3 for 5¢? 7 .....

8. If the first Sunday of a month is on the 5th, the third Sunday will be on what day of the month? 8 .....

9. George Washington was born in 1732. He died in 1799. How many years did he live? 9 ..... yrs.

10. Mr. Brown asked for 78¢ worth of stamps at the post office window and laid down a dollar bill in payment. How much more will he need to add to the dollar in order to receive a quarter in change? 10 .....cts.

11. Joe's teacher is 10 years older than twice Joe's age. Joe is 6 years old. How old is his teacher? 11 .....

12. Dorothy is 8 years old and Julia is 10. What will the sum of their age be four years from now? 12 ..... yrs.

13. Jack sold seven pigs for $18 each. How much did he receive? 13 $.....

14. Roy spends ¼ of each 24 hours at school. How many hours each day does he spend at school? 14 ..... hrs.

15. A wire 112 feet long was doubled to make a two-strand clothes line. The posts for the clothes line must be placed how many feet apart? 15 .....ft.

16. A farmer sold a half dozen calves for $222. What was the average price per calf? 16 $.....

(GO ON TO NEXT PAGE)

17. The World Calendar has 312 working days each year. How many working days does it have each quarter year? 17 .....

18. Mr. Green bought a 5-gallon can of paint for his garage. It took only 3⅓ gallons. How many gallons did he have left? 18 .....gal.

19. In the summer vacation of 9 weeks, Richard earned $95 and spent $50. How much did he save each week? 19 $.....

20. A history teacher assigned the first half of chapter 6. The chapter begins on page 196 and ends on page 228. To what page must the class read? 20 p. .....

21. Each of 16 girls paid 75¢ into a club fund. The expenses of the club were $2.25, $1.50, $3.00, and $3.50. How much remained in the club fund? 21 $.....

22. Joe's train left at 8:30 a. m. and arrived in the city at 11:15 a.m. How long was Joe on the train? 22 .....h.....m.

23. In a certain period of time, one pig will eat 2⅔ bushels of corn. In the same time how many bushels will 9 pigs eat? 23 .....bu.

24. The daily temperature readings at 8 o'clock each morning for a week were 63, 58, 54, 51, 55, 57, 61. What was the average temperature for the week? 24 ..... degrees

25. Mr. Carter had 2½ acres of land which he marked off into lots of ⅝ acres each. How many lots did he have? 25 .....

26. When Mr. Morris sold his cattle he gave his son Claude $263.20, which was ⅕ of the amount of the sale. For how much did the cattle sell? 26 $.....

27. A plane with an air speed of 160 miles per hour is traveling head-on into a wind of 30 miles per hour. How far will the plane have traveled in one and one-half hours? 27 .....mi.

28. A radio-direction chart used in flying has a scale of 32 miles to the inch. Two towns 80 miles apart will be shown on the chart how many inches apart? 28 .....in.

29. Some clocks and watches are now made with 24 hours marked on the dial instead of 12. (Each new day starts at midnight.) When an ordinary clock reads 5:35 p.m., what does this new clock read? 29 .....

30. What is the next fraction in this series of fractions? ⅓, ⅙, $\frac{1}{12}$ 30 .....

31. The stub of Mr. Harper's bank book showed a balance of $100. He then made three deposits of $10 each and wrote two checks for $4 each. How much is his balance now? 31 $.....

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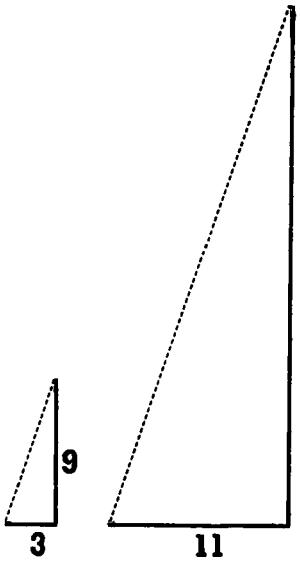


32. A fence post which is 9 feet high casts a shadow 3 feet long. How high is a telephone pole which casts a shadow 11 feet long at the same time of day?

32 .....ft.

33. May's father is 42 years old and her grandfather is 70. Her father's age is what fraction of her grandfather's age? (Write the answer in the form of a decimal fraction.)

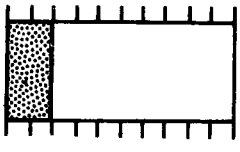
33 .....

34. Here are the arithmetic scores made by a group of children:

Mary 17	Jane 15	Maude 16
Bob 20	Bess 22	Carl 10
Joe 13	Roy 12	Ben 17
Ruth 11		

What per cent of the group made lower scores than Jane?

34 .....%



35. What per cent of this rectangle is shaded?

35 .....%

36. How many square feet are there in a rug that is 72 inches by 120 inches?

36 .....sq. ft.

No. Right..... *Score*.....

No. right	0
Score	29

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
32	35	39	42	46	50	54	56	59	63	64	65	66	67	68	70	72	73	75	77	78	79	80	81	83	84	85	86	87	88	90	91	92	93	94	95

TEST 10. ARITHMETIC COMPUTATION

DIRECTIONS: **Find the answers as quickly as possible but try to be accurate. Be sure to write each answer in the space provided for it at the right-hand margin of the page. Before beginning work on a problem be sure you understand what you are to do.**

ANSWERS

(1)

Subtract

$$\begin{array}{r} 8 \\ 5 \\ \hline \end{array}$$

(2)

Add

$$\begin{array}{r} 5 \\ 8 \\ 0 \\ 4 \\ \hline \end{array}$$

(3)

$4 \times 6 =$

1 .....

2 .....

3 .....

(4)

Add

$$\begin{array}{r} 76 \\ 28 \\ \hline \end{array}$$

(5)

Subtract

$$\begin{array}{r} 34 \\ 7 \\ \hline \end{array}$$

(6)

$24 \div 3 =$

4 .....

5 .....

6 .....

(7)

Add

$$\begin{array}{r} 6855 \\ 564 \\ 7067 \\ \hline \end{array}$$

(8)

Subtract

$$\begin{array}{r} 560 \\ 187 \\ \hline \end{array}$$

(9)

Subtract

$$\begin{array}{r} 7042 \\ 4685 \\ \hline \end{array}$$

7 .....

8 .....

9 .....

(10)

Multiply

$$\begin{array}{r} 5808 \\ 6 \\ \hline \end{array}$$

(11)

$37\overline{)1591}$

(12)

Multiply

$$\begin{array}{r} 475 \\ 300 \\ \hline \end{array}$$

10 .....

11 .....

12 .....

(GO ON TO NEXT PAGE)

(13) Add

$$\begin{array}{r} 465.83 \\ 92.66 \\ 634.95 \\ \hline \end{array}$$

13 .....

(14) Multiply

$$\begin{array}{r} 625 \\ 68 \\ \hline \end{array}$$

14 .....

(15)

$9 \overline{)\ 639}$

15 .....

(16) Multiply

$$\begin{array}{r} 532 \\ 407 \\ \hline \end{array}$$

16 .....

(17)

$6 \overline{)\ 258}$

17 .....

(18) Add

$$\begin{array}{r} \frac{2}{9} \\ \frac{5}{9} \\ \hline \end{array}$$

18 .....

(19) Multiply

$$\begin{array}{r} 4834 \\ 426 \\ \hline \end{array}$$

19 .....

(20)

$9 \overline{)\ 27.63}$

20 .....

(21)

$17 \overline{)\ 2006}$

21 .....

(22) How many sixths does this fraction equal? $\frac{2}{3} =$

22 .....

(23) Multiply

$$\begin{array}{r} 31.2 \\ 4.03 \\ \hline \end{array}$$

23 .....

(24)

$26 \overline{)\ 53409}$

24 .....

(25) Subtract

$$\begin{array}{r} 8\frac{1}{2} \\ 5\frac{1}{4} \\ \hline \end{array}$$

25 .....

(26) $\frac{1}{4} \times \frac{3}{5} =$

26 .....

(27) Subtract

$$\begin{array}{r} \frac{2}{3} \\ \frac{5}{8} \\ \hline \end{array}$$

27 .....

(28) Add

$$\begin{array}{r} 6\frac{1}{4} \\ 4\frac{3}{8} \\ \hline \end{array}$$

28 .....

(GO ON TO NEXT PAGE)

(29) $53 \overline{)\ 30497}$

(30) $\frac{5}{6} \times \frac{1}{2} =$

(31) Add

$14\frac{4}{5}$
$8\frac{2}{3}$

29 .....

30 .....

31 .....

(32) How many eighths does this fraction equal? $\frac{9}{24} =$

32 .....

(33) $394 \overline{)\ 247038}$

(34) Multiply

.56
.008

(35) Add

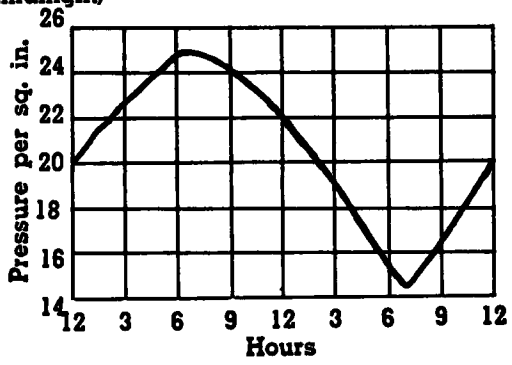
2 gal. 3 qts. 1 pt.
4 gal. 2 qts. 1 pt.

33 .....

34 .....

35 ....gal. ....qts.

Water Pressure Record for Twenty-four Hours on a Summer Day in a Small City (midnight to midnight)



(36) What was the highest pressure reached for the period of record?

36 .....lb.

(37) At what hour was the water pressure lowest?

37 .....p.m.

(38) $.06 \overline{)\ 34.0584}$ = 56764

Place the decimal point in its proper position in the answer.

38 5 6 7 6 4

(39) $2\frac{3}{4} \div 1\frac{1}{2} =$

(40) Subtract

10
$5\frac{4}{7}$

(41) Subtract

yr.	mo.
1959	4
1941	10

39 .....

40 .....

41 ....yrs. ....mo.

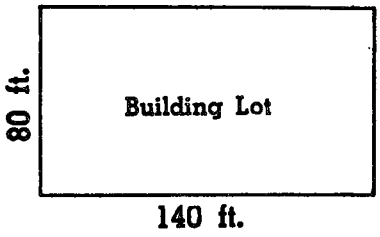
(GO ON TO NEXT PAGE)

(42) $\frac{5}{7} \div \frac{3}{4} =$

(43) $8 \overline{)\ .328}$

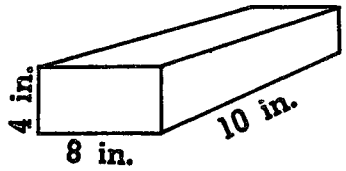
42 .....

43 .....



(44) What is the area of this building lot?

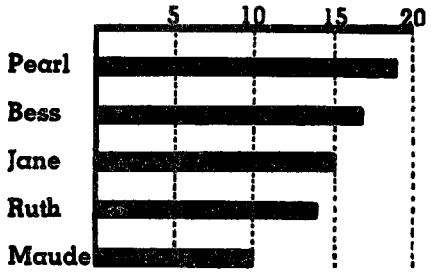
44 .....sq. ft.



(45) Find the volume of this box.

45 .....cu. in.

This graph shows the number of words spelled correctly by each of five girls.



(46) The number of words spelled by Jane is what per cent of the number of words spelled by Maude?

46 .....%

No. Right..... *Score*.....

No. right	0	1	2	3	4	5	6	7	8
Score	28	30	32	35	37	39	41	44	46

9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
50	53	55	56	58	59	60	61	63	64	64	65	65	66	67	67	68	68	69	70	71	72	74	75	76	78	79	81	82	84	85	86	88	89	91	92	94	95

MANUAL OF DIRECTIONS AND INTERPRETATIONS

For Forms Q, R, S, and T: Intermediate and Advanced

The Gray-Votaw-Rogers

General Achievement Tests

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For Forms Q, R, S, and T: Intermediate and Advanced

The Gray-Votaw-Rogers General Achievement Tests

By

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Southwest Texas State Teachers College

Directions for Administering

INTERMEDIATE TEST: (Grades 4-6)

ADVANCED TEST: (Grades 7-9)

(The same directions apply to both Intermediate and Advanced tests)

Study carefully these directions before attempting the administration of these tests. The same directions apply to all forms.

1. Pupils may be tested in ordinary classroom groups or in larger groups of a hundred or more.

2. While taking the test, each pupil should keep his test booklet folded back so that only the page on which he is working is visible.

3. A stop watch is most convenient, but an ordinary watch may be used satisfactorily for timing. The ordinary watch should be used in this way: On each of the tests except number 4 (Spelling), when the signal "Go" is given, the positions of the minute and second hands should be written down. To this the number of minutes for the period should be added, which will give the time when the pupils should be required to stop.

4. To prevent tiring the children, each form should be given in two to four sittings, separated by at least fifteen-minute recesses.

5. Throughout the administration of these tests it is hardly possible to give too much explanation to the children. Essential explanations of what the children are to do are given in this manual. It is frequently necessary, however, for the administrator of the tests to add to the printed directions by further explanations and illustrations. On the other hand, *after* a test is begun, in no case should the examiner give any assistance, such as helping a child with difficult words.

6. In all of the seven recognition tests (the two arithmetic tests and the spelling test are the only ones not of the recognition type), the directions instruct the pupils not to skip items. It is very important that the pupils comply. They should be told that if they are not sure which answer is right to select the one they think is most probably right and x the square for that answer.

The examiner or his assistant should move about the room to make sure that directions are being followed.

If a child wishes to change an answer he has made, he must erase carefully his first x and make another to indicate his final choice.

To prevent tiring the children, each form should be given in four sittings. It is suggested that the four sittings be as follows:

1. Soon after the beginning of the school day
2. After the morning recess
3. After the noon hour
4. After the afternoon recess

The advanced tests may be given to seventh, eighth, and ninth grade pupils in two sittings—one in the morning and one in the afternoon.

Order of Tests and Time to be Allowed

FIRST SITTING

	MINUTES
Distributing booklets, supervising filling in of blanks on cover page, etc.	5 (about)
Test 1. Elementary Science	10
Test 2. Language	10
Test 3. Literature	12
Total	37

SECOND SITTING

Test 4. Spelling	15 (about)
Test 5. Reading: Vocabulary	8
Test 6. Reading: Comprehension	10
Total	33

THIRD SITTING

Test 7. Social Studies	12
Test 8. Health and Safety	10
Test 9. Arithmetic Reasoning	20
Total	42

FOURTH SITTING

Test 10. Arithmetic Computation	28

FIRST SITTING

After pupils are seated, see that each has a pencil and provide each with a test booklet. (Have on hand a few extra pencils to provide in case of shortage or mishap.)

Say, **"Do not open the test booklet or write on it until I tell you to."** (In an informal manner now have all of the information blanks on the first cover page filled in.)

Say, **"Do not begin until I say 'Go,' and the instant I say 'Stop,' you are to stop and hold your pencils up. After we begin a test, you must not ask questions. If you break your pencil point, hold up your hand and I will give you another pencil. Do your best at your own regular speed of work, and pay no attention to what others are doing.** (Pause) **Now turn over the page to Test 1. You will see Test 1 printed at the top of the page."**

Test 1. ELEMENTARY SCIENCE

Say, **"Read the directions at the top of the page."** (Allow time for the children to read the directions down to the sample sentence.) Then say, **"The sample says: A turkey is a 1 fish 2 fowl 3 plant. Fowl, the second word, is the right answer; so an x has been placed in the second square.**

"When you begin, go as far as you can; but do not skip any. Ready—Go."

Allow 10 minutes; then say, **"Stop. Now turn to Test 2."**

Test 2. LANGUAGE

Say, **"Read the directions at the top of the page."** (Allow time for the children to read directions down to the sample sentence.) Then say, **"The first sample says: The boys (is are) playing ball. Are, the lower word, is the right one; so an x has been placed in the second square. In the second sample, May should be spelled with a capital letter; so an x has been placed in the first square. The sentence in the third sample is a question; so the ending with the question mark is the right one.**

"Go as far as you can, but do not skip any. Ready—Go."

Allow 10 minutes; then say, **"Stop. Now turn to Test 3."**

Test 3. LITERATURE

Say, **"Read the directions and the sample at the top of the first page.** (Pause) **The sample says: Captain Kidd was a famous 1 soldier 2 king 3 pirate 4 writer. Pirate, the third word, is the right answer; so an x has been placed in the third square. Do not skip any sentences. Ready—Go."**

Allow 12 minutes; then say, **"Stop. Close your booklets."** (First sitting ends here. Collect the booklets and have them redistributed at the second sitting. If the room is to be emptied of children and is to remain locked or guarded during the recess, each child may leave his booklet on his desk.)

SECOND SITTING

(Be sure that each child has his own booklet.)

Test 4. SPELLING

See that booklets are open at the proper place.

Say, **"Now I am going to pronounce some words for you to write. Write each letter in each word carefully so that your writing can be read easily. The words are numbered. I shall give you the number of the word first. Be sure to write the number first and then write the word on the same line."** (Be sure to start with the correct number on the list for the grade being tested.)

Read the number, pronounce the word, read the definition, and then pronounce the word a second time. The word may be repeated still further if requested. (The examiner should look over the list of words before administering the test and should refer to a dictionary for the pronunciation of any of the words about which he is doubtful.)

When some of the children begin to slow up because of the harder words say, **"Do your best. If you cannot write all the words, write those you can."**

(A card on which is listed the words for the spelling test will be found in each bundle of tests purchased.)

When you have pronounced the last word for the grade being tested and the pupils have written it, say, **"Stop. Turn to Test 5."**

TEST 5. READING: VOCABULARY

Say, "Read the directions at the top of the page. (Pause) **The sample says: A lad is a 1 girl 2 pony 3 boy 4 kitten. Boy, the third word, is the answer; so an x has been placed in the third square.**

"Do not skip any. Ready—Go."

Allow 8 minutes; then say, **"Stop. Turn to Test 6."**

Test 6. READING: COMPREHENSION

Say, **"Read the directions at the top of the first page.** (Pause) **The sample story says: Bob has a kitten, a puppy, and a rabbit. He feeds his kitten milk, his puppy meat scraps, and his rabbit carrots.**

"That is the story about Bob and his pets. The first sample says: Bob has 1 one pet 2 two pets 3 three pets. Three pets, the third answer, is the right one; so an x has been placed in the third square. The second sample question says: He feeds meat scraps to his 1 kitten 2 puppy 3 rabbit. Puppy, the second answer, is the right one; so an x has been placed in the second square. Do not skip any of the questions. Ready—Go." (See that pupils keep trying until time is called.)

Allow 10 minutes; then say, **"Stop. Close your books."** (Second sitting ends here. Collect the booklets and have them redistributed at the third sitting.)

THIRD SITTING

Test 7. SOCIAL STUDIES

After each child has received his booklet, say, **"Turn to Test 7.** (Pause) **Read the directions at the top of the first page.** (Pause) **The sample says: The capital of the United States is 1 Denver 2 Washington 3 Chicago 4 Atlanta. Washington, the second word, is the answer; so and x has been placed in the second square.**

"Do not skip any. Ready—Go."

Allow 12 minutes; then say, **"Stop. Turn to Test 8."**

Test 8. HEALTH AND SAFETY

Say, **"Read the directions at the top of the first page. (Pause) The sample says: A drink that builds body tissue is 1 coffee 2 tea 3 milk 3 ginger ale. Milk, the third answer, is the right one; so an x has been placed in the third square.**

"Do not skip any. Ready—Go."

Allow 10 minutes; then say, **"Stop. Turn to Test 9."**

Test 9. ARITHMETIC REASONING

Say, **"Read the directions at the top of the page. Work as rapidly as you can, but be accurate. Write your answers in the blank provided. Do not spend too much time on a problem. If you cannot solve it, go on to the next and come back to it later if you have time. You may figure on the pages of your booklet. Ready—Go."**

Allow 20 minutes; then say, **"Stop. Close your books."** (Third sitting ends here. Collect the booklets.)

FOURTH SITTING

Test 10. ARITHMETIC COMPUTATION

Say, **"Turn to Test 10. (Pause) Read the directions at the top of the page. Solve the problems as quickly as you can. You may use the pages of your booklet to figure on, but be sure to put each answer on the blank provided. Keep working until you come to the printed words, 'End of test.' Ready—Go."**

Allow 28 minutes; then say, **"Stop. Close your books."** (End of test.)

(In administering all of the ten tests, keep watch to see that pupils do not stop at the bottom of a page, thinking they have completed the test.)

Occasionally a child may start marking the answer squares at random without reading the items. If this occurs, stop him and explain to him that he must read each item carefully and mark the answer square that he believes is correct.

COMPARABLE SCORES

Two parallel rows of figures will be found at the end of each test. A child's **score** is the figure in the bottom row which corresponds to the number of correct answers made by him on the test. This is the score which is to be recorded and is the only record of his performance which need be kept. The scores were determined by a transmutation formula, so that the scores of the several tests would be comparable. For example, a child whose score for each of the tests is 46 has uniform achievement in all the divisions.

It is this score, not the number right, which is significant. A teacher may consider a test "too difficult" in terms of the number answered, and consider the achievement of her class as "low" by the same criterion, yet the average *score* of her class may be average or above in terms of comparison with other schools. Any attempt to use the number right as an index of achievement fails to utilize the chief advantage of standardized tests, that of making meaningful comparisons.

As a specific example, consider the Science and the Literature tests. On the Literature test *21* right out of *50* items represents the same level of accomplishment as *31* right out of *44* on the Science test, each having a score value of *70*, representing typical beginning 7th grade achievement.

The authors of these tests have no desire to dictate curricula, but this example illustrates another point which is sometimes neglected; namely, *average performance is not necessarily satisfactory performance.* Although the books used in constructing items for the Literature test were selected from standard lists of books and authoritative recommendations for the respective grade levels, it would appear that the gross level of achievement on this test is lower than in other tests of this battery. To the authors, this indicates the strong possibility that many of these books which authorities say should be read by pupils are not available to them, and that they have had no opportunity to become acquainted with these books, rather than to suggest that the sampling in the test is "too difficult." Hence, a test performance which is "average" may not represent adequate acquaintance with literature.

NORMS

The Individual Educational Chart on each test booklet shows the norms. The scales for each of the ten tests, as well as the scale for the total average, are directly comparable with the grade and age norms.

On the educational grade scale of this chart horizontal lines are used to indicate spans of accomplishment from the end of one school grade to the end of the next higher school grade. Also, at each score-point on the scale the grade equivalent is given to the nearest one-tenth of a grade, and the age equivalent is given to the nearest year and month.

The age-scale increases exactly one year for each grade. The reason for this is that each grade norm was determined from the scores of only those pupils who were in the grade and normal age for the grade. The scores of under-age and over-age pupils were not included. Normal ages for the grades were defined as follows:

Grade	Age as of Sept. 1
1	5 yrs. 9 mo. to 7 yrs. 2 mo. 29 days
2	6 yrs. 9 mo. to 8 yrs. 2 mo. 29 days
3	7 yrs. 9 mo. to 9 yrs. 2 mo. 29 days
etc.	

This plan of defining normal ages allows a span of eighteen months for each grade, with an overlap of six months per grade. It is more flexible than the rigid plan of allowing only one year of age to each grade, and therefore is more consistent with practical and reasonable promotional practices.

In addition to the regular grade norms determined from the scores of the normal-age pupils as defined above (see Table 1), two additional sets of norms (Tables 2 and 3) are provided. One of these sets was determined from scores of the high-ability

normal-age pupils and the other from the scores of the low-ability normal-age pupils.

The authors are indebted to Mrs. Kate Malloch Appling and Mr. Aaron Posey, who made empirical determinations of these off-center norms for a check against the theoretical determinations made by the authors.

The use of these high and low norms should help impress the user of these tests with the fact of natural, wide differences in educational performances of pupils and thus lessen the temptation to "double" promote or to "fail" normal-age pupils whose scores differ widely from the regular grade norm.

PRACTICE EFFECT

There are numerous advantages of having available several equated forms of a test. One of these advantages is the provision of a two- or three-year cycle for repeating in rotation the various forms. Another advantage is the provision for close seating of children, when necessary, by using two forms in the same testing program.

Four equated forms (Q, R, S, and T) of the Gray-Votaw-Rogers General Achievement Tests are available. These take care of any possible need for variety of forms. No hesitancy should be felt about using a form in a school in which the identical form was used previously, provided two years have elapsed. The influence of having taken the test previously will have disappeared completely in that time. As a matter of fact, the authors have found that the average practice effect amounts to less than .1 of a point between two different forms given to the same children on two consecutive days. The gain from practice amounts to only slightly more when the same form is administered to the same children two weeks after the first administration.

"Do Not Skip"

A study made by one of the authors of these tests revealed that when children are permitted to "pass" (make no answer) items about which they feel doubtful when dealing with the recognition type of tests, the resulting scores are influenced by a personality trait known as Ascendancy-Submission. Moreover, this liberty affects the scores of superior students and inferior students differently. Therefore, in order to confine the test as nearly as possible to a measure of educational attainment, the directions in all recognition divisions are, "Do not skip any items."

Notwithstanding this administrative effort to encourage all pupils to attempt all recognition items, a skipped item is NOT to be marked as wrong.

Coaching Pupils

The Gray-Votaw-Rogers General Achievement Tests have been normed carefully by being administered to children who have had no previous direct "coaching" for the test. The authors have provided a highly useful educational measuring instrument when used according to directions. A doctor who gives a prescription must depend upon the intelligence of the nurse or patient to follow his directions and thus receive benefits. The nurse or patient is seldom able to deceive the doctor. Likewise, while the authors of this educational measure have no means of preventing its misuse, school administrators can detect readily cases in which it has been misused. Only ignorance of the functions of testing or dishonesty could motivate a person to coach children from a copy of a test they are to take.

USES OF TEST RESULTS

These tests may be given for diagnostic and supervisory purposes at any time during the school year. Diagnosis may be made of individual pupils and also of classes. The authors recommend that at least four weeks of school work elapse in the fall before the tests are administered. That much time is ordinarily required for "recovery" and adjustment of pupils. Remedial work may then be applied where it is needed, and another form may be used near the end of the school year to measure progress.

The results of the tests should be of much value to the principal or counselor in his guidance program. Sectionizing of pupils may be made safely on the basis of the tests.

In this connection, teachers should be warned that copies of the test are not to be used as a drill device to make up deficiencies, even after the test has been given. In constructing a standardized test, it is necessary, in order to test all pupils from the poorest to the best, to include many items which do not represent minimum essentials or common learnings for all children in a given grade. To drill all pupils in a grade over all items would therefore not only indicate a complete lack of understanding of the tests, but it would also have the serious effect of forcing many pupils, perhaps a whole grade, to work on items far beyond their capacity or ability to understand.

For instance, if individual or group scores on Test 5, *Vocabulary*, are low, an attempt should be made to improve vocabulary in general, not to drill on these particular words. It is to be remembered that these are sampled from the hundreds of words which a pupil should learn, and are intended in no way to represent a "course of study" in vocabulary for any grade. This same principle holds true for most of the other tests, with the possible exception of Test 2, *Language*, and Tests 9 and 10, *Arithmetic*. These three may be used to a limited degree for diagnosis, since an analysis of errors will indicate to some extent the areas needing attention, *if* these errors are checked against the learnings expected for a given grade.

In order to secure a clear picture of a child's educational status, mark points on each of the subject-scales at the positions of the child's respective subject-scores and another point on the Total (average) scale at the position of his Total (average) score. Connect these points with a line. Between the educational age scale and the educational grade scale, draw a continuous horizontal line at the level of the child's Total (average) score. Then connect the left end of this line with the point on the chronological age scale which indicates the child's actual age, and connect the right end of the line with the point on the school grade scale which indicates his actual grade location.

Then repeat the procedure described above by connecting the class-average scores for each of the subjects and by drawing a horizontal line at the level of the Total (average) score for the class. (This second set of lines should be drawn with colored pencil.) Thus a child's achievement in the various divisions of the test may be compared with his own average, with the average of his class, or with the test norms. It is not unusual for a pupil's subject scores to deviate as much as 3 to 5 points (up or down) from his total average.

A completed Individual Educational Chart for a fifth-grade child is illustrated below. The chart is based on the scores made by the child plus the following data:

Date of test: December 1
Chronological age of child on date of test: 10—3
School grade on date of test: 5.3

(On December 1, about .3 of the school year has elapsed.)

From the chart it may be seen that this child's educational level is higher than would be expected of him from either a consideration of his actual age or a consideration of his school grade. The educational performance represented by a total average score of 59 is that of a child at the age 10 — 9, whereas this child is only 10 — 3. Similarly, his educational performance is .3 of a grade above his grade placement.

Test	Score
1. Elemen. Science	60
2. Language	56
3. Literature	54
4. Spelling	59
5. Reading: Vocab.	63
6. Reading: Comp.	66
7. Social Studies	63
8. Health & Safety	57
9. Arith. Reas.	58
10. Arith. Compu.	54

10) 590

Total Average 59

Educational Grade 5.6

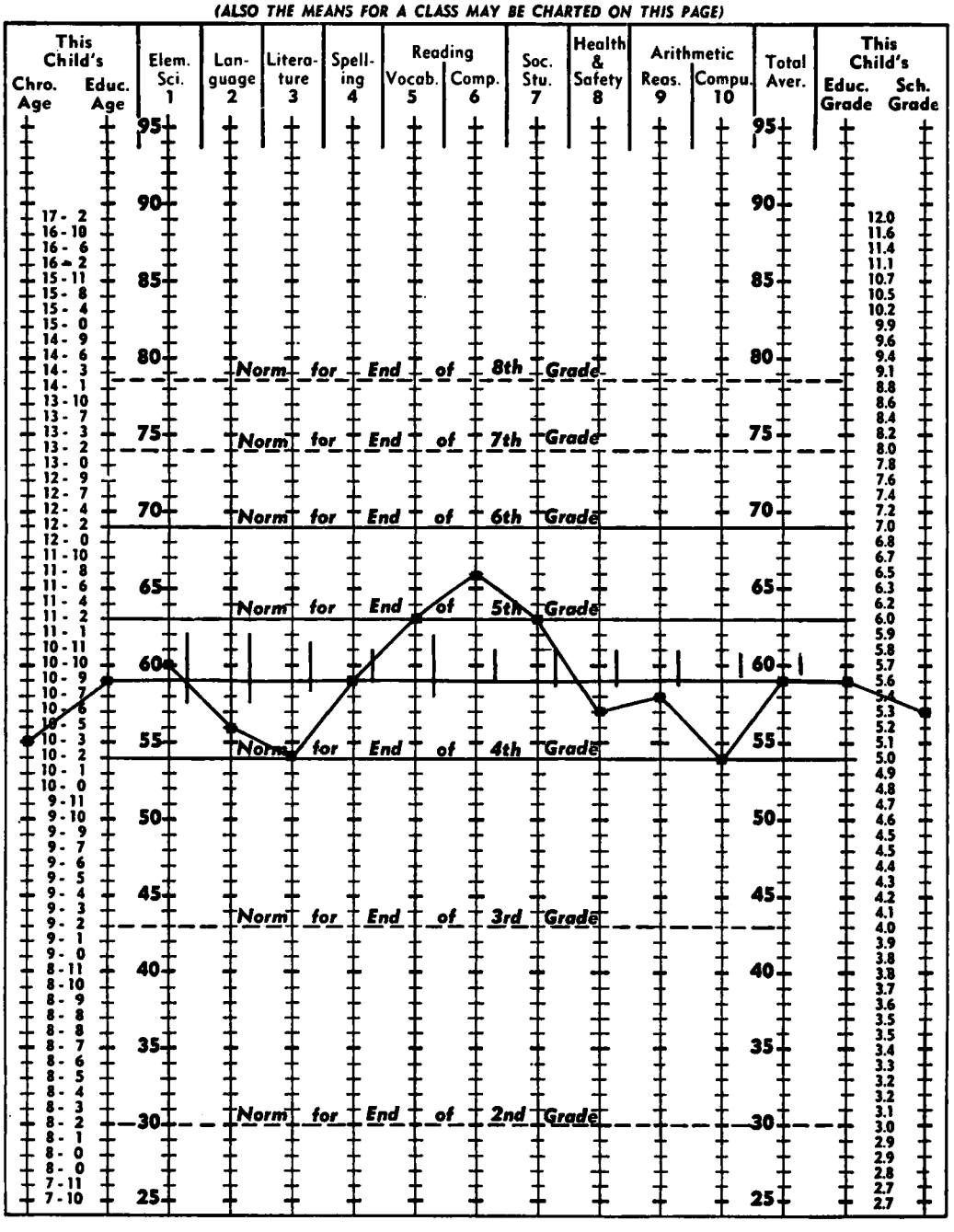
Educational Age 10-9

1. The educational grade and age scales on this Profile Chart indicate the norms for this test.
2. Ages above 14-2 and below 8-2 are extrapolated.
3. The short vertical lines are probable errors of the estimated true scores.
4. The scale of scores for all of the tests has been equated. Thus uniform achievement will be indicated for a child if the line connecting his ten score-points is approximately horizontal.

DIRECTIONS printed in manual must be followed in administering this test if the results are to be compared with norms.

INDIVIDUAL EDUCATIONAL CHART

(ALSO THE MEANS FOR A CLASS MAY BE CHARTED ON THIS PAGE)



ANALYZING YOUR SCHOOL'S RESULTS

Although comparison of the norms of your class or your school with those of corresponding units of other schools is important, comparison of individuals or classes within your own school unit is of even greater importance.

Scores should be tabulated in intervals of five (or three for Primary) for the various grades and buildings. These should be combined for the school as a whole. Means and standard deviations of each table should then be computed, and a picture of your school situation will emerge that will be highly revealing. Regardless of norms, no school can afford to refuse promotion to too large a proportion of its pupils.

In comparing one section with another or one school with another, it should be borne in mind that a mere difference between the means of the sections does not alone establish superiority of the one or the other. The probable error for each mean should be computed—

$$P\,E_m = \frac{.6745 \times S\,D}{\sqrt{N}}$$

Then the probable error of the difference between the two means should be computed—

$$P\,E_{dif} = \sqrt{P\,E_{m_1}{}^2 + P\,E_{m_2}{}^2}$$

The difference between the two means should be at least three times this probable error of the difference to justify the conclusion that it is significant (not due to chance).

The type of interpretation desired should govern the manner of tabulating or classifying scores. The table below illustrates one form of tabulating scores necessary for certain important interpretations.

DISTRIBUTION OF TEST SCORES

Scale* of Scores	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Total Ave.
95-99											
90-94											
etc. down to											
5-9											
0-4											
Totals											
Means											
S D's											

*The midpoint of an interval is its "center of gravity." (For example, midpoints of intervals above are 97, 92, 87, 82, and so on.)

After the scores have been distributed in the table, means and standard deviations may be computed for each of the ten tests and for the total average. Of course the common average may be computed without tabulating. (It should be remembered that a child's total average score is found by taking one-tenth of the sum of his ten test scores; the nearest integer should be used. Examples: record 43.4 as 43, record 43.6 as 44, and record 43.5 as 44.)

Model computations are given on the following page for a typical distribution of total average scores for a fourth grade class of thirty-two pupils.

Scale of Scores	f	d	fd	fd^2
65-69	1	4	4	16
60-64	2	3	6	18
55-59	3	2	6	12
50-54	4	1	4	4
45-49	8	0		
40-44	5	—1	—5	5
35-39	4	—2	—8	16
30-34	3	—3	—9	27
25-29	2	—4	—8	32
	32		—10	130

$$\frac{-10}{32} = -.31$$

$$\text{Mean} = \text{Assumed Mean} + \frac{\text{sum fd}}{N} \times \text{interval}$$

$$= 47 + \frac{-10}{32} \times 5$$

$$= 47 - 1.55$$

or Mean = 45.45

$$\text{S D} = \text{interval} \times \sqrt{\frac{\text{sum fd}^2}{N} - \left(\frac{\text{sum fd}}{N}\right)^2}$$

$$= 5 \times \sqrt{\frac{130}{32} - \left(\frac{-10}{32}\right)^2}$$

$$= 5\ \sqrt{4.0623 - (-.31)^2}$$

$$= 5\ \sqrt{4.0623 - .0961}$$

$$= 5\ \sqrt{3.9662} \quad \text{or} \quad 5\ \sqrt{3.97}$$

$$= 5 \times 1.99$$

S D = 9.95

As these fourth grade pupils took the test about January 1 their mean score of 45.45 indicates that they are approximately equal to the normal attainment of fourth graders at that time.

Standard deviation is a measure of dispersion of individuals from the mean. The range from one standard deviation below the mean to one standard deviation above it includes approximately two-thirds of all the scores. Thus it may be seen that these children are approximately normal in variability.

A device for determining the number of months to be added to the whole number of years of age as given by the child on the front cover of his test booklet is suggested below. By this method a child's age in years and months may be determined approximately for the day of the test. This is the age to be indicated on the Individual Educational Chart.

Month of birth	Jan.	Feb.	Mar.	April 15	April 16	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
No. months to be added	3	2	1	0	12	11	10	9	8	7	6	5	4

The date for which this scale was prepared was April 15. Therefore the critical line is drawn to separate this date from April 16. A similar scale may be prepared to fit any date on which a test may be given.

For quickly converting dates of birth into ages as of September 1, 1948, use the following table (after it has been extended, of course, to include required range of ages):

Year of Birth	MONTH OF BIRTH		
	Jan., Feb., Mar., April, May	June, July, Aug., Sept., Oct., Nov.	Dec.
1943	5½	5	4½
1942	6½	6	5½
1941	7½	7	6½
1940	and so on to include all possible ages of pupils in your grade or school.		

This converting table should be used during the entire school year of 1948-49 regardless of the time of year tests are given. By adding one year to each figure in the "Year of Birth" column the table will be modified for use during the school year of 1949-50. In similar manner the table may be modified to apply to any school year.

A clearer view of the positions of individuals in relation to the group may be secured by simply listing the pupils of a grade or class in order of scores as follows:

Fifth Grade

(Tested near end of school year)

Names	Achievement Scores (Tot. Ave.)	Chronological Age
R. J. A.	84	11 ×
B. M. L.	76	10
M. J.	73	9½—
S. H. M.	71	10
J. L. S.	70	12 +
L. E. R.	68	10½
M R.	66	11½+
A. F. V.	64	10
B. H.	62	10½
C. L. K.	60	11 ×
W. C.	56	10½
B. W.	55	10
J. H.	53	11 ×
M. J. B.	50	10½
L. T. E.	47	12 +
R. M. S.	44	10
W. J. C.	40	12 +

1. The two short horizontal lines in the column of achievement scores mark high- and low-ability norms.
2. A + sign placed after a chronological age signifies over-age for the grade.
3. A — sign signifies under-age.
4. A × sign indicates that while the child is normal-age for this grade he would also be normal-age for the next higher grade. (R. J. A. and J. L. S. should be advanced perhaps to the sixth grade at once. It is possible that M. R. should be reclassified though additional information about him should be secured before advancing him. This information is invaluable to the administrator, the director of the guidance program, and the classroom teacher. Any attempt to individualize the instructional program

of a school must be based upon test results and other objective evidence concerning the individual child.)

DEVELOPMENT OF TESTS

The development of these tests has been dependent upon the co-operation of many individuals and the use of many sources. The authors acknowledge indebtedness to the Texas State Department of Education; to many faithful teachers who contributed items; to superintendents, principals, and teachers who administered the tests for experimental purposes; and to Dr. David F. Votaw, Jr., who did much of the statistical computation. Particularly were the public schools of San Marcos, Texas, and of Austin, Texas, obliging in permitting the experimental administration of the original list of items for validating data.

The tests were originally published in 1935 under the title of The New-South Achievement Tests. Each form contained nine divisions which had been validated and normed for grades 4-7 only.

In 1936 a primary division was added for use in grades 1-3.

In 1938 the New-South Achievement Test was revised and extended to include the eighth grade. Also at that time a tenth section, Elementary Science, was added. With the 1938 revision the name of the tests was changed to The Gray-Votaw General Achievement Tests.

A second revision (1942) included some very important changes. On the basis of information obtained from many sections of the United States, many items of the 1938 revision were discarded. To replace these, items of proved validity were used. The edition was divided into three sections: Primary for 1-3; Intermediate for grades 4-6; and Advanced for grades 7-9.

The present edition (1948) retains the previous divisions, Primary, Intermediate, and Advanced, but involves such extensive developments during the past two years that it may be regarded as a new test. Dr. J. Lloyd Rogers, a specialist in elementary education, has joined the staff of authors. All items used have been tested for validity as in the construction of an entirely new test. *Safety* has been incorporated into a division called *Health and Safety.*

Equivalent forms of the present edition will be called Q, R, S, and T. To maintain continuity of school records for schools that have been using previous forms, the new test provides a score scale that is identical to previous score scales; i.e., a child will make the same score on any one of the following forms: E, F, G, H, Q, R, S, T.

PROCEDURE

I. Selection of original items (about 4,000, or double the number finally used for the four forms).
   1. Analysis of courses of study and textbooks.
   2. Analysis of teacher's outlines and test questions.
   3. Judgment of expert supervisors.
   4. Analysis of scales (such as Thorndike's Teacher's Word Book, the Ayres-Buckingham Spelling Scale, Horn's Spelling Scale, and so on.)
   5. Arrangement in tentative order of difficulty.

II. Experimental try-out of items.
   1. Determining percentage of pupils for each grade knowing each answer.
   2. Graphing of above data.
   3. Rejecting items not showing proper "climb" through the successive grades. (A general achievement test should measure not the ephemeral knowledge of a grade but the surviving knowledge from school experiences.)
   4. Rearranging surviving items in order of difficulty and renumbering them.

III. Separation into four forms.
   1. Selecting items for the four forms to ensure equal mean difficulty and the same variability in difficulty.

IV. Publication.

V. Derivation of norms.*
   1. Administration to 2,160 pupils carefully selected to sample the school population. (Two trial time limits).
   2. Computation of means and standard deviations for grade and age groups.
   3. Transmutation to comparable scores.

VI. Determination of reliability measures.
   1. Correlation between forms.
   2. Probable error of estimated true scores.

*NOTE: All scores used for determining norms and other statistical results were secured by the authors either by directly administering the tests or by immediately supervising their administration by trained assistants. In no case was the administration of the tests left to the local teacher or principal. The users of these tests may be confident, therefore, that the **norms were obtained under the conditions described and directions given in this manual.** If the user follows these directions, his results are comparable with the norms.

EASY SCORING

The new forms Q, R, S, and T are especially designed for ease and speed of scoring. They are completely objective. In all of the divisions only right answers are marked and counted. The usual, complicated procedure of discounting for guessing multiple-choice answers, which necessitates marking and counting wrong as well as right answers, has been eliminated completely. With this simplified plan of marking only right answers scoring can be done about three times as fast and with little or no loss of validity. Validity is preserved by the requirement that the pupil attempt each multiple-choice item, by the provision of ample time, and by the use of selected distractors.

In addition to the detailed directions for scoring which are given on the key, the following general rules should be observed:

1. In the recognition tests, any mark placed in or on the correct square should be accepted as correct.

2. Scoring can be done with greater speed and

fewer errors if Test 1 of all the booklets is scored first, then Test 2 of all the booklets, etc.

The consistency of the two sets of scores (one determined by number of right answers only and the other by the discount-for-guessing formula) is revealed in the following correlation coefficients of the score yield of 114 intermediate pupils:

TEST	No. Responses	Correl.
Elem. Science	3	.94
Language	2	.93
Literature	4	.90
Read. Vocab.	4	.98
Soc. Studies	4	.97
Health and Safety	4	.96

STATISTICAL RESULTS

Although no special statistical training is required to give and interpret these tests, the norms on the profile chart being self-explanatory, for those who desire to make a technical study of results the following statistical findings are offered:

TABLE 1.

NORMAL-AGE GRADE NORMS FOR END OF SCHOOL YEAR

TEST	Intermediate			Advanced		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	54.0	63.0	69.0	74.0	78.5	82.5
1. Elementary Science	54.2	63.0	68.5	73.9	77.1	83.8
2. Language	54.0	64.5	68.8	73.9	78.8	81.3
3. Literature	53.6	61.5	67.4	73.3	78.4	81.1
4. Spelling	54.0	62.5	69.8	73.4	79.7	83.2
5. Reading: Vocabulary	53.9	61.3	68.3	74.0	80.6	81.6
6. Reading: Comprehension	55.0	63.3	69.2	73.6	77.9	81.9
7. Social Studies	53.9	63.0	69.8	74.0	79.2	80.8
8. Health and Safety	53.5	62.3	68.8	73.7	78.0	82.3
9. Arithmetic: Reasoning	53.8	64.9	69.5	72.6	77.9	84.7
10. Arithmetic: Computation	53.9	63.5	69.9	74.8	78.4	84.1

TABLE 2.

HIGH ABILITY NORMS
(MEANS FOR HIGH ABILITY THIRD OF THE NORMAL-AGE PUPILS)

TEST	INTERMEDIATE			ADVANCED		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	63.7	74.4	78.0	82.0	85.0	90.0
1. Elementary Science	63.5	74.0	79.0	81.0	84.0	92.0
2. Language	62.8	75.0	81.0	84.0	87.0	81.0
3. Literature	65.0	70.0	74.0	78.2	83.3	89.0
4. Spelling	64.7	77.7	83.6	78.0	89.2	93.0
5. Reading: Vocabulary	65.7	73.0	79.0	82.0	87.3	89.6
6. Reading: Comprehension	67.0	76.0	81.0	84.0	87.5	90.0
7. Social Studies	60.1	72.0	79.0	83.4	86.0	88.6
8. Health and Safety	63.3	71.7	78.0	80.0	84.5	89.4
9. Arithmetic: Reasoning	62.8	71.0	75.0	78.0	82.0	88.0
10. Arithmetic: Computation	62.0	68.7	75.0	80.0	83.0	89.0

TABLE 3.

LOW ABILITY NORMS
(MEANS FOR LOW ABILITY THIRD OF THE NORMAL-AGE PUPILS)

TEST	INTERMEDIATE			ADVANCED		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	40.1	48.7	56.4	64.2	68.6	71.7
1. Elementary Science	41.3	49.3	57.0	64.4	66.8	68.2
2. Language	42.7	48.1	56.2	65.0	66.3	67.8
3. Literature	41.7	43.1	53.2	60.4	65.2	68.0
4. Spelling	41.3	45.9	57.1	63.0	69.8	73.2
5. Reading: Vocabulary	37.2	42.1	53.0	64.1	68.7	70.1
6. Reading: Comprehension	37.7	43.4	56.6	62.6	66.3	69.8
7. Social Studies	38.6	49.2	55.6	60.8	67.5	68.4
8. Health and Safety	38.0	49.6	57.5	60.8	66.7	73.8
9. Arithmetic: Reasoning	39.3	54.5	61.0	63.3	71.5	73.6
10. Arithmetic: Computation	47.9	57.2	64.2	67.8	72.1	76.1

TABLE 4.
VARIABILITY OF SCORES

TEST	STANDARD DEVIATIONS*	
	Intermediate Gr. 4-6	Advanced Gr. 7-9
Total Average	13.0	9.9
1. Elem. Sci.	15.0	12.3
2. Language	16.9	9.6
3. Literature	13.5	9.5
4. Spelling	13.4	13.2
5. Read.: Vocab.	16.3	9.4
6. Read.: Compre.	16.1	10.3
7. Social Studies	12.6	10.2
8. Health and Safety	12.4	9.6
9. Arith. Reas.	11.7	8.6
10. Arith. Compu.	9.8	9.0

*NOTE: These standard deviations are for a range of three grades. They are somewhat less for a single grade. For example, the standard deviation for the total average scores for grade 5 is 11.4 and for grade 8 it is 7.5.

TABLE 5.
RELIABILITY

TEST	INTERMEDIATE (N = 245) (Grades 4—6)		ADVANCED (N = 192) (Grades 7—9)	
	Coef. of Reliability	P.E. of Est. True Score	Coef. of Reliability*	P.E. of Est. True Score
Total Average	.99	1.24	.97	1.08
1. Elementary Science	.92	4.63	.80	3.42
2. Language	.93	4.56	.84	3.04
3. Literature	.87	3.75	.77	2.29
4. Spelling	.92	2.02	.97	2.82
5. Reading: Vocabulary	.91	4.53	.89	1.96
6. Reading: Comprehension	.82	2.66	.85	2.20
7. Social Studies	.87	2.55	.92	1.95
8. Health and Safety	.85	2.51	.90	2.09
9. Arithmetic: Reasoning	.89	2.37	.85	1.61
10. Arithmetic: Computation	.93	1.34	.91	1.82

*These coefficients were obtained by correlating scores on odd items with scores on even items and then by applying the Spearman-Brown formula. They are slightly reduced when determined for the narrower range of a single grade. For example, the coefficient of reliability of the total average scores for grade 8 is .953.

The short vertical lines on the profile chart indicate the probable errors of estimated true scores. These are to be referred to only when considering the reliability of the scores of one pupil. The probable error of estimate of the mean true score for a class may be found by dividing the probable error of the estimated true score by the square root of the number of pupils in the class.

RECORDING SCORES ON PERMANENT RECORD CARD

An important value of these tests will be lost unless a record of each child's performance is entered upon his permanent cumulative record card. For guidance purposes later, interpretation of a child's record will be greatly simplified if the record indicates merely the grade in which the test was taken and the percentile rank. Table 6 supplies the necessary information for recording these important data.

TABLE 6.

PERCENTILE SCORES EQUIVALENT TO TOTAL AVERAGE SCORES

(END OF SCHOOL YEAR)

Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Percentile Rank Equivalent
72	79	83	86	89	97	95
67	76	81	83	87	92	90
64	74	78	81	85	89	85
62	72	76	79	83	87	80
60	70	75	78	82	86	75
58	68	74	77	81	85	70
57	67	73		80	84	65
56	66	72	76			60
55	65	71	75	79	83	55
54	63	70	74		82	50
53	61	68	73	78	81	45
51	60	67	72	77	80	40
49	58	65	71	76	79	35
47	56	63	70	75	78	30
45	54	61	68	73	76	25
43	52	59	66	71	74	20
41	49	56	64	68	72	15
38	46	52	60	64	69	10
34	41	47	55	60	64	5

Note: The percentile rank equivalent indicates the percentage of pupils who made lower scores. For example, if a fourth grade pupil's total average score is 58, a percentile rank of 70 will be recorded on his permanent record card; if a sixth grade pupil's total average score is 77, a percentile rank of about 83 will be recorded; etc.

Advanced Battery Partial | FORM J

STANFORD ACHIEVEMENT TEST

TRUMAN L. KELLEY • RICHARD MADDEN • ERIC F. GARDNER • LEWIS M. TERMAN • GILES M. RUCH

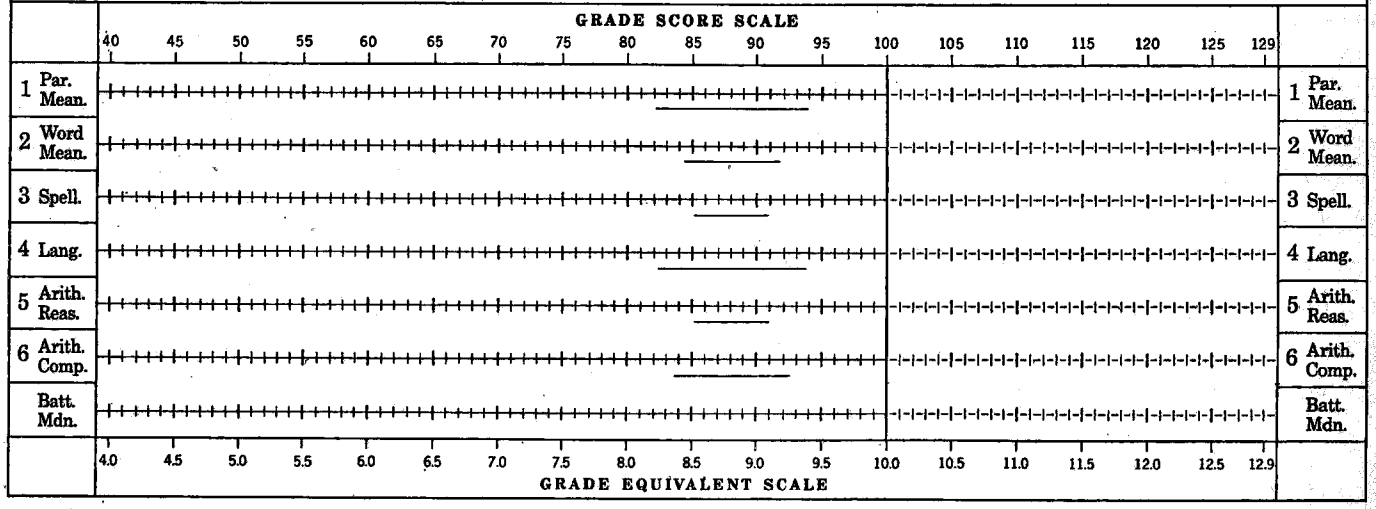
Name_____ Age_____ Grade_____ Boy or girl_____

Teacher_____ School_____ Date of birth_____ *Year* _____ *Month* _____ *Day*

City or Town_____ State_____ Date_____

	1 PAR. MEAN.	2 WORD MEAN.	AVER. READ.	3 SPELL.	4 LANG.	5 ARITH. REAS.	6 ARITH. COMP.	AVER. ARITH.	BATTERY MEDIAN
Grade Equiv.									
Age Equiv.									
%-ile Rank									

Individual Profile Chart



Grade equivalent values above 10.0 are extrapolated values and not to be interpreted as signifying the typical performance of pupils of the indicated grade placement. (See Directions for Administering.)

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a

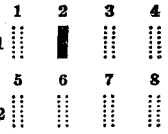
TEST 1 *Paragraph Meaning*

◀2

DIRECTIONS: Read each paragraph below. Decide which one of the numbered words at the right is best for each blank, and then mark the answer space which is numbered the same as the word you have chosen. Study the sample below, and answer the other questions in the same way.

SAMPLE: I am shorter than my sister and taller than my brother. This morning we stood beside one another. I looked down at my ___51___ and ___52___ at my sister.

51 1 friend 2 brother 3 sister 4 feet
52 5 around 6 back 7 up 8 down



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1 The children went to the circus. They saw elephants and monkeys and many other animals. There were many clowns and lots of popcorn and peanuts. The children said that they wished a ___1___ would come every day.

1 1 parade 2 clown 3 circus 4 monkey

2-3 The gold used for jewelry is mixed with another metal, usually copper. Pure gold is very soft, and jewelry made of it would not wear well. Therefore, copper or some other ___2___ is mixed with the gold to make it ___3___.

2 1 metal 2 mineral 3 material 4 chemical
3 5 brighter 6 prettier 7 softer 8 harder

4-5 Insects that fly at night often make mistakes. It may be that they cannot tell the light of the moon from that given by an open fire. Sometimes these ___4___ fly into a ___5___ and are killed.

4 1 animals 2 insects 3 moths 4 birds
5 5 window 6 house 7 flame 8 car

---

6 I go to bed at seven o'clock. Bob stays up until eight. We both rise at seven o'clock in the morning. Bob sleeps an hour ___6___ than I do.

6 1 longer 2 more 3 later 4 less

7-8-9 Wool is clipped from live sheep by a process called shearing. The entire mat of fleece from each animal comes off in a single piece. With electric clippers one man can ___7___ from 150 to 200 ___8___ a day. After shearing, the ___9___ is rolled up and sent to the mill.

7 1 clip 2 run 3 kill 4 feed
8 5 pounds 6 sheep 7 lambs 8 pelts
9 9 skin 10 hide 11 fleece 12 cotton

10-11-12-13 A few years ago most freight was carried by railroad trains. Now such things as furniture and even automobiles are sent across country on trucks. Goods sent by ___10___ can go only where ___11___ have been laid, but goods sent by ___12___ can reach any point to which a ___13___ runs.

10 1 truck 2 rail 3 freight 4 express
11 5 roads 6 paths 7 tracks 8 highways
12 9 truck 10 rail 11 freight 12 express
13 13 drive 14 trail 15 track 16 road

14-15 A long time ago the people of Peru did not know how to write. In order to count, they tied knots in threads of different colors. Each color meant a different kind of thing. The ___14___ in a thread stood for the things being ___15___.

14 1 knots 2 colors 3 loops 4 twists
15 5 counted 6 named 7 written 8 used

Go on to the next page.

16-17-18 The dog, first domesticated during the Old Stone Age, belongs to the same family as the wolf, jackal, and fox. It is believed that some breeds of dogs resulted from crossing two of these three animals, but perhaps not all dogs had the same ancestors. Many breeds have developed since the __16__. It is hard to see anything of the __17__ in the barkless dog of the North American Indians, or any kinship between the __18__ and the cocker spaniel.

16	1 great migration	2 Stone Age	16	1	2	3	4
	3 American revolution	4 First World War					
17	5 jaguar	6 lynx	17	5	6	7	8
	7 jackal	8 puma					
18	9 badger	10 antelope	18	9	10	11	12
	11 leopard	12 wolf					

19-20 Ventriloquism is the art of making sounds so that they appear to come from a distance rather than from the speaker's own mouth. It is an ancient __19__, and many authorities believe that various phenomena such as the Greek oracles and the Egyptian speaking statues owe their explanation to the practice of __20__ by the priests.

19	1 science	2 art	19	1	2	3	4
	3 custom	4 event					
20	5 deceit	6 mystery	20	5	6	7	8
	7 prophecy	8 ventriloquism					

21-22 Crude oil from wells in Texas and other Western states is now transported in pipes to refineries in such distant states as California, Illinois, and Pennsylvania. Pumping stations are located 25 to 40 miles apart along each pipe line. From storage tanks near the wells the oil passes into the __21__ and is __22__ to the refineries.

21	1 tankers	2 pipe lines	21	1	2	3	4
	3 tank cars	4 oil trucks					
22	5 shipped	6 tricked	22	5	6	7	8
	7 hauled	8 pumped					

23-24-25 A common example of a chemical reaction is the rusting of iron. A gas called oxygen which is present in the air combines with the silvery metal iron to form a reddish brown substance known in chemistry as ferrous oxide, but commonly called __23__. This substance is quite different from either the __24__ or the __25__ which combined to form it.

23	1 iron	2 oxygen	23	1	2	3	4
	3 copper	4 rust					
24	5 iron	6 copper	24	5	6	7	8
	7 rust	8 gas					
25	9 oxide	10 oxygen	25	9	10	11	12
	11 air	12 moisture					

26 During the French and Indian War more than one hundred English colonists were captured by the Indians at Deerfield, Massachusetts, and taken into the forest. Later, some were ransomed but many refused to return to __26__.

26	1 Pennsylvania	2 custody	26	1	2	3	4
	3 captivity	4 civilization					

27-28-29 Architectural styles are the result of social, technical, and environmental factors. The flat-roofed houses of the Egyptians and the Aztecs were practical because of dry climates. This illustrates the __27__ factor. For heavy structures both peoples used the pyramid, rather than beams, buttresses, girders, etc. This illustrates the __28__ factor. The decorations of these two peoples were widely different because of traditions and aesthetic standards. This illustrates the __29__ factor.

27	1 environmental	2 technical	27	1	2	3	4
	3 social	4 common					
28	5 environmental	6 technical	28	5	6	7	8
	7 social	8 common					
29	9 environmental	10 technical	29	9	10	11	12
	11 social	12 common					

30-31-32 The windward side of a great mountain chain has plenty of rainfall, whereas the regions on its lee are more arid. This difference is due to the fact that when prevailing winds strike high mountains, precipitation occurs and relatively little moisture is carried over the crest. Thus, the regions lying on the __30__ side of mountain chains are better suited to __31__ than those protected from the __32__.

30	1 windward	2 northern	30	1	2	3	4
	3 southern	4 front					
31	5 mining	6 defense	31	5	6	7	8
	7 agriculture	8 sheep raising					
32	9 westerlies	10 northerlies	32	9	10	11	12
	11 hurricanes	12 prevailing winds					

Go on to the next page.

33-34 A dinosaur called "stegosaurus" had a brain-like nerve center inside his skull, and another, larger one in the region of the pelvis. This latter controlled the reptile's heavy tail, which was armed with horn-like spines. Because of the dominance of the rear __33__, scientists jokingly ask whether the __34__ wagged his tail, or vice versa.

33 — 1 spines; 2 nerve center; 3 pelvis; 4 head — 33: 1 2 3 4

34 — 5 reptile; 6 mastodon; 7 man-eater; 8 mammal — 34: 5 6 7 8

35-36-37 Much of the history of man might be written in terms of ocean currents. The warm Gulf Stream contributes so much to the temperatures of England and northern Europe that if somehow it could be cut off, the region of the British Isles would be nearly uninhabitable. The mass of frigid arctic water helps bend the __35__ to take a __36__ direction and is itself prevented from reaching the __37__.

35 — 1 Gulf Stream; 2 Polar Current; 3 Japan Current; 4 Atlantic — 35: 1 2 3 4

36 — 5 northward; 6 westerly; 7 north-easterly; 8 southeast-erly — 36: 5 6 7 8

37 — 9 Gulf Stream; 10 Atlantic; 11 British Isles; 12 Newfound-land Coast — 37: 9 10 11 12

38-39 The noun *radical* comes from the Latin word for root. A radical is something fundamental, or at the root of things. One who wishes to upset the government is a radical because he wishes to make fundamental changes. In chemistry the fundamental parts of a compound are radicals. Recently a critic of radicalism denounced a professor's book entitled "Organic Radicals in the Presence of Catalysts." It is reasonable to assume that the subject matter of the book was __38__. A dictionary would inform one that catalysts are chemical agents and not foreign agents. The critic should conclude that the book was __39__.

38 — 1 radical; 2 subversive; 3 unfamiliar to the critic; 4 entertaining — 38: 1 2 3 4

39 — 5 about astronomy; 6 un-American; 7 subversive; 8 about chemistry — 39: 5 6 7 8

40 Unusual meanings are sometimes attached to words. For as long as we have a record, "seeding" has meant putting seeds into the ground to grow into mature plants. "Cloud seeding" is an attempt to __40__.

40 — 1 put seeds into the ground; 2 put seeds into clouds; 3 make seeds mature; 4 make rain — 40: 1 2 3 4

41-42 Myths are imaginary tales and have for their heroes gods and goddesses. In fables animals talk and have the characteristics of human beings. Apollo, the sun-god, figures prominently in many Greek __41__. The story of the "Dog in the Manger" is one of the most familiar __42__.

41 — 1 fables; 2 legends; 3 myths; 4 histories — 41: 1 2 3 4

42 — 5 myths; 6 fables; 7 legends; 8 anecdotes — 42: 5 6 7 8

43-44 Symbiosis is a very interesting biological phenomenon. It is the intimate living together of two different forms of life. For example, the Yucca, a desert plant, has its pollen carried from one flower to another by the Yucca moth only. This moth lays its eggs in a Yucca seed pod; the eggs hatch; the larvae eat some seeds and nothing else; they turn into moths, get covered with pollen, fly to a second Yucca blossom, carrying the pollen and fertilizing the seeds of the second plant. Thus __43__. The scientific term for wonderful cases like this is __44__.

43 — 1 the moth helps the Yucca; 2 the Yucca helps the moth; 3 each helps the other; 4 each is necessary to the other — 43: 1 2 3 4

44 — 5 evolution; 6 mutual aid; 7 symbiotic union; 8 biologic accommodation — 44: 5 6 7 8

Stop.

No. RIGHT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Gr. score	18	20	22	24	25	26	28	30	32	33	35	37	39	41	43	44	46	49	51	53	55	57	59	62	64	67	70	73	76	80	84	88	93	97	101	105	108	111	114	117	120	123	127	129

TEST 2 *Word Meaning*

DIRECTIONS: In each exercise decide which of the four numbered words will complete the sentence best. Look at the number of this word. Mark the answer space at the right which is numbered the same as the word you have chosen. Study the samples.

SAMPLES:

51 The day that comes after Friday is — 1 **Monday** 2 **Tuesday** 3 **Saturday** 4 **Sunday** 51 — 3

52 To draw on a blackboard, use a piece of — 5 **pencil** 6 **straw** 7 **eraser** 8 **chalk** 52 — 8

---

1 Mary Smith and John Doe are cousins if they have the same —
1 **grandmother** 2 **mother** 3 **sister** 4 **daughter** 1

2 Marvelous means — 5 **pleasant** 6 **distant** 7 **wonderful** 8 **great** 2

3 To lash is to — 1 **deceive** 2 **whip** 3 **destroy** 4 **waste** 3

4 Anyone over 21 years old is — 5 **a graduate** 6 **an adult** 7 **a major** 8 **a patriot** 4

5 If you can identify a butterfly, you can —
1 **exhibit it** 2 **stuff it** 3 **mount it** 4 **recognize it** 5

6 Something you must do, such as paying taxes, is —
5 **a custom** 6 **a sacrifice** 7 **a duty** 8 **an opportunity** 6

7 Height, weight, and temperature are all —
1 **distances** 2 **visible** 3 **feelings** 4 **measurements** 7

8 Groceries arranged to attract customers are —
5 **displays** 6 **campaigns** 7 **evidence** 8 **bargains** 8

9 To attempt a job is to — 1 **condemn it** 2 **oppose it** 3 **imagine it** 4 **undertake it** 9

10 Things which are much alike are — 5 **equal** 6 **handsome** 7 **similar** 8 **opposite** 10

11 A small thing given as evidence of good faith is a —
1 **petition** 2 **spindle** 3 **token** 4 **goblet** 11

12 A person elected to office should be — 5 **confused** 6 **pitied** 7 **capable** 8 **noble** 12

13 When you don't sense anything which is going on about you, you are —
1 **unconscious** 2 **sullen** 3 **prosperous** 4 **sensible** 13

14 The group of men who run a business are its —
5 **managers** 6 **customers** 7 **salesmen** 8 **engineers** 14

15 Saving money for a "rainy day" is — 1 **likable** 2 **industrial** 3 **fearful** 4 **advisable** 15

16 People who write letters to each other —
5 **correspond** 6 **translate** 7 **interrupt** 8 **interview** 16

17 The dead body of a wild animal is a — 1 **vestige** 2 **carcass** 3 **corpuscle** 4 **corruption** 17

18 When you have learned your next lesson well, you are —
5 **mistaken** 6 **prepared** 7 **discouraged** 8 **educated** 18

19 Any statement about which there is question is —
1 **vagrant** 2 **elastic** 3 **appreciable** 4 **debatable** 19

20 When a person repeatedly fails at something he wants to do, he may become —
5 **buoyant** 6 **frustrated** 7 **fruitless** 8 **drenched** 20

21 Something written about or talked about is —
1 **a token** 2 **a topic** 3 **a title** 4 **an article** 21

22 If you have made up your mind about something, you have —
5 **a conviction** 6 **an investigation** 7 **a sermon** 8 **a doubt** 22

Go on to the next page.

23 Clothing of any kind is called — 1 woolens 2 apparel 3 robes 4 draperies 23

24 Money wasted foolishly is — 5 proffered 6 severed 7 scandalized 8 squandered 24

25 If everybody agrees upon a plan, the agreement is —
1 unanimous 2 moderate 3 proportional 4 conscientious 25

26 An individual who insists upon doing things his way only is —
5 nimble 6 obstinate 7 kingly 8 towering 26

27 When a man seeks a position with a certain firm, he becomes —
1 an applicant 2 a suitor 3 a petitioner 4 a contractor 27

28 A dramatic event in a story is called —
5 an epistle 6 a nucleus 7 a novelette 8 an episode 28

29 "She has a good chance to recover" means that improvement is —
1 certain 2 assured 3 impossible 4 probable 29

30 A difficulty to be overcome is — 5 an obstacle 6 a miracle 7 a vehicle 8 a barnacle 30

31 The way an army executes its campaigns is called its —
1 enmity 2 eclipse 3 tactics 4 treatise 31

32 A beginner in some sport is — 5 a novice 6 a professional 7 a private 8 an assailant 32

33 In a story meant to teach something, the teaching is called the —
1 fable 2 myth 3 plot 4 moral 33

34 One who works hard is — 5 brazen 6 alluring 7 ancestral 8 diligent 34

35 A daily newspaper calls the number of papers it sells each day its —
1 administration 2 attraction 3 circulation 4 introduction 35

36 Any very long, unpleasant experience is —
5 an ordeal 6 an offense 7 a vigil 8 a seclusion 36

37 One senator speaks of another senator as his —
1 collector 2 elector 3 colleague 4 chaplain 37

38 Spotlessly clean clothes are — 5 blanched 6 immaculate 7 stark 8 purged 38

39 A small event that is part of a story is — 1 a plot 2 an epic 3 an incident 4 an era 39

40 Any national issue over which there is disagreement is —
5 controversial 6 contraband 7 tabu 8 subversive 40

41 Corrupt politics are due largely to public —
1 responsiveness 2 antagonism 3 degradation 4 indifference 41

42 To destroy something completely is to —
5 detract it 6 distort it 7 annihilate it 8 depress it 42

43 A very exact measurement is — 1 absolute 2 concise 3 precise 4 fundamental 43

44 The "crossing" of two or more kinds of grain produces —
5 mongrels 6 hybrids 7 formulas 8 chaff 44

45 An interesting conversationalist often has a store of —
1 denominations 2 anecdotes 3 alibis 4 conveyances 45

46 Sometimes an opinion on a subject is changed after —
5 consternation 6 delegation 7 dissolution 8 deliberation 46

Stop.

No. right	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Gr. score	26	27	29	30	31	33	34	36	38	40	42	44	46	48	50	53	55	57	59	62	64	67	69	71	73	75	77	79	82	84	86	88	90	93	96	99	101	104	107	110	113	116	119	122	125	129

TEST 3 *Spelling*

7a

7b

DIRECTIONS: In each exercise below, one of the words is spelled in three different ways. If the correct spelling is there, mark the answer space which has the same number as the correct spelling. If the correct spelling is **not given** as one of the three spellings, mark the answer space under NG as the right answer; NG stands for **not given.**

SAMPLES:

91 The color is (1 rid. 2 red. 3 rud.) ..... 91 — 1 | **2** | 3 | NG

92 an (4 eg 5 egge 6 eeg) for breakfast ..... 92 — 4 | 5 | 6 | NG

---

1 bedroom (1 furnitur 2 furnituer 3 furniture) 1

2 Sally plays the (4 piano. 5 peano. 6 paino.) 2

3 Sam saw the (1 smock 2 smok 3 smoak) from the fire... 3

4 A (4 lawyer 5 lauyer 6 lawer) defended him 4

5 He took the doctor's (1 medicene. 2 medicine. 3 medicen.) 5

6 They will come (4 agian. 5 agen. 6 agan.) 6

7 The guards moved (1 quitly. 2 quietly. 3 quitely.) 7

8 Let's (4 explore 5 exsplore 6 explor) the cave 8

9 I heard the (1 speech. 2 spech. 3 speach.) 9

10 There is (4 durt 5 drite 6 dirte) on his hands 10

11 The sand slowly (1 setteld 2 setled 3 settled) in the jar.. 11

12 Joe studies (4 geogrophy. 5 geography. 6 geogerphy.) 12

13 The (1 famely 2 famly 3 famley) is at home 13

14 Jack plays the (4 rol 5 roal 6 role) of the hero.... 14

15 The road rises (1 gradualy. 2 gradually. 3 graduly.) 15

16 Spinach has many (4 vitamins. 5 vitamens. 6 vitemins.) 16

17 Don't be (1 impatient. 2 impateint. 3 impationt.) 17

18 John's voice is (4 horse. 5 hourse. 6 hoarse.) 18

19 a tennis (1 tournament 2 torniment 3 tornament) 19

20 He (4 realey 5 realy 6 reelly) liked it 20

21 It rains (1 freequently. 2 frequentley. 3 frequently.) 21

22 an (4 unfortunate 5 unfortunat 6 unfortunette) mistake 22

23 We read good (1 literiture. 2 literture. 3 literature.) 23

24 Ruth is (4 genrally 5 generaly 6 generally) here 24

25 Father (1 rarly 2 rarely 3 rarley) goes hunting 25

26 The (4 berres 5 berrys 6 beries) are ripe 26

27 We saw the (1 prittiest 2 prittest 3 prettest) flowers 27

28 My uncle studies (4 philosophy. 5 filosophy. 6 philosofy.) 28

29 No chairs were (1 avalable. 2 avialable. 3 available.) 29

30 Anne has a (4 magority 5 majority 6 majorety) vote 30

31 Sue (1 eventualy 2 eventually 3 eventally) arrived 31

32 He is (4 ignorrent 5 ignorent 6 ignorant) of the facts 32

33 the (1 ofensive 2 offencive 3 offensive) team 33

34 We saw him in the (4 vicinty. 5 vicinity. 6 visinity.) 34

35 No cause was (1 apparant. 2 apparrent. 3 apparent.) 35

36 in friendly (4 terratory 5 teritory 6 teratory) 36

37 Chemistry is a (1 sciense. 2 sceince. 3 sience.) 37

38 Jane is respected for her (4 sincerity. 5 sincirety. 6 sinserity.) 38

Go on to the next page.

TEST 3 *Spelling* (Continued)

8a

8b

39 The moon enters a new (1 phaze. 2 phase. 3 fase.) 39

40 He is a college (4 proffessor. 5 profesor. 6 professor.) 40

41 very (1 conscious 2 concious 3 consious) of his duty 41

42 The scene is (4 picheresque. 5 picturesque. 6 picherest.) 42

43 wired for (1 electrizity 2 electrecity 3 electrisity) 43

44 The two lines are (4 paralell. 5 parellel. 6 parallel.) 44

45 The firm was a (1 finacial 2 financail 3 financial) success 45

46 extreme (4 simplacity 5 simplicity 6 simplisity) 46

47 The loss is (1 insignificant. 2 insignifacent. 3 insignifecant.) 47

48 Such an idea is (4 abserd. 5 absourd. 6 absurd.) 48

49 Perhaps I (1 immagine 2 imagine 3 imagin) it 49

50 The (4 blizzerd 5 blissard 6 blizard) brought snow 50

51 It is not (1 necessaraly 2 necessarily 3 necesarily) wrong 51

52 Alice did not (4 apoligize. 5 apologize. 6 apologise.) 52

53 The task was done with (1 facility. 2 fasility. 3 facilaty.) 53

54 Betty made (4 prier 5 priar 6 prior) arrangements 54

55 Jim ate a hot (1 biscut. 2 bisciut. 3 bisket.) 55

56 It is a (4 fundamental 5 fundemental 6 fundimental) rule 56

57 My (1 concience 2 conscience 3 consience) is clear 57

58 a (4 scarcity 5 scarcaty 6 scarsity) of food 58

59 It is a boy's club (1 enitiation. 2 initation. 3 initiation.) 59

60 The cost of (4 admition 5 admision 6 addmission) is low 60

61 An (1 airial 2 aerial 3 aereal) is on the roof 61

62 The ship was (4 imence. 5 immence. 6 immense.) 62

63 We are (1 privaleged 2 priviledged 3 privileged) to help 63

64 Dan will pay the (4 expence. 5 expents. 6 expens.) 64

65 a (1 comparativly 2 comparatively 3 compartively) small one 65

66 The vote was (4 unanimous. 5 unanmous. 6 unanamous.) 66

67 The (1 indetedness 2 indebtedness 3 indeteness) is heavy 67

68 The answer is (4 logicle. 5 lodgical. 6 lojicle.) 68

69 Bob had a fine (1 recommendation. 2 reccommendation. 3 recomendation.) 69

70 a cough from (4 bronchitis 5 bronchytes 6 bronchites) 70

71 The meeting is (1 adjuorned. 2 adjorned. 3 adjurned.) 71

72 to (4 perceive 5 precieve 6 preceive) the truth 72

Stop.

No. right	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Gr. score	25	26	27	28	29	30	31	32	33	34	35	37	38	40	41	42	43	45	46	48	49	50	52	53	55	56	57	59	60	61	62	63	64	65	67	68	69	70	71	73

No. right (Cont'd)	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Gr. score	74	75	76	77	78	79	80	81	83	84	86	87	89	91	94	96	98	100	102	105	107	110	112	114	117	119	121	124	126	128	129	129

TEST 4 *Language*

◀9a ◀9b

DIRECTIONS: In each pair of words in heavy type there is an error in either capitalization or punctuation. You are to decide which one of each pair has the correct capitalization and punctuation. Then mark the answer space at the right that has the same number as the correct form.

SAMPLES: This is 1 mr. Jones. / 2 Mr. Jones. ..... 1 2 ■

3 St. Louis, Missouri / 4 St. Louis Missouri 3 4

A Musical Program

We heard 1 beethoven's / 2 Beethoven's 1 2 1

3 "sixth Symphony" / 4 "Sixth Symphony" on the Symphony Hour... 3 4 2

Featured instruments were:

A. 5 The strings / 6 the Strings 5 6 3

B. 1 Flutes and other Woodwinds / 2 Flutes and other woodwinds 1 2 4

"This symphony," the announcer said,

3 "describes / 4 "Describes a storm." 3 4 5

A Good Play

In our play my friend 5 Sam, / 6 Sam acted the part of Rip Van Winkle..... 5 6 6

1 "I'll / 2 I'll get enough sleep for once," he said. 1 2 7

Our play was 3 good some / 4 good. Some 3 4 8

people wanted to see it 5 again. / 6 again, ... 5 6 9

For the answer, turn to the third 1 chapter. / 2 Chapter. 1 2 10

Freedom of speech was a 3 jeffersonian ideal. / 4 Jeffersonian ideal. 3 4 11

Both 5 Democrats, / 6 Democrats and Republicans approved. 5 6 12

This notebook represents two 1 months' / 2 month's work. 1 2 13

We had a heavy 3 storm, / 4 storm; an inch of rain fell. 3 4 14

"The storm struck 5 suddenly, / 6 suddenly," our paper reported..... 5 6 15

We have 1 arithmetic / 2 Arithmetic and English every day. 1 2 16

The president, it 3 seems / 4 seems, has called a meeting. 3 4 17

DIRECTIONS: Decide whether each of the sentences below is *simple* (only one thought), *compound* (two independent clauses), or *complex* (one clause subordinate to another). Mark the answer space under S if the sentence is simple, CD if it is compound, and CX if it is complex. Mark only the one that tells what form the sentence is.

S CD

Our school offers a course in printing..... 18

My cousin and I are taking it now..... 19

My cousin got a B, and I got an A..... 20

Orville Wright and his brother Wilbur built the first successful airplane..... 21

S CX

Before 1920, people did not have radio sets. 22

Before radio became popular, children read more books..... 23

Pioneer women made soap from fat which they had saved..... 24

One kind of palm tree from which many useful products are obtained is the coconut palm..... 25

DIRECTIONS: If the word in heavy type is the subject of the sentence, mark the answer space under S. If it is the verb, mark the answer space under V.

S V

This *land* has been plowed..... 26

That plane will soon *land*..... 27

For these men, *working* brought its reward. 28

These men are *working* to finish their job. 29

Where does that *light* come from?..... 30

Light streamed in the windows..... 31

Go on to the next page.

TEST 4 *Language* (Continued)

10a

10b

DIRECTIONS: In each sentence, decide which of the numbered words is correct. Then mark the answer space at the right which has the same number as the word you have chosen.

Bob and 1 I / 2 me painted the scenery.	1	2	32
He 3 doesn't / 4 don't watch where he's going.	3	4	33
Where 5 are / 6 is my books?	5	6	34
Our team will win this game 1 easy. / 2 easily.	1	2	35
Each of us 3 ought / 4 had ought to work faster.	3	4	36
Is this the 5 right / 6 write road?	5	6	37
Nancy can certainly read 1 good. / 2 well.	1	2	38
I might 3 of / 4 have gone if I'd been asked.	3	4	39
Take a picture of Helen and 5 I. / 6 me.	5	6	40
Some of us were 1 lying / 2 laying on the ground.	1	2	41
3 Whose / 4 Who's sweater is this?	3	4	42
The girls have all 5 run / 6 ran away.	5	6	43
Tell me when 1 your / 2 you're ready.	1	2	44
Miss Martin is 3 too / 4 to busy to see us.	3	4	45
The dog is looking for 5 it's / 6 its master.	5	6	46
Have you 1 drank / 2 drunk your milk?	1	2	47
My kitten was 3 drowned. / 4 drownded.	3	4	48
Last 5 weak / 6 week they took a trip.	5	6	49
The baby had 1 fell / 2 fallen downstairs.	1	2	50
Most people like to eat 3 regular. / 4 regularly.	3	4	51
Both the cat and the dog 5 have / 6 has fleas.	5	6	52
We are 1 all ready / 2 already late.	1	2	53
I 3 can / 4 can't hardly wait to see him.	3	4	54
Everybody wants 5 his / 6 their own coat.	5	6	55
The birds had all 1 flew / 2 flown South.	1	2	56
A girl 3 who / 4 which giggles is a nuisance.	3	4	57
They fought a 5 strange / 6 funny battle.	5	6	58
It was cold in the house 1 with / 2 without no heat. . .	1	2	59
The captain 3 led / 4 lead his men to victory.	3	4	60
A boy 5 who / 6 whom I knew got lost.	5	6	61
Have you ever 1 shook / 2 shaken apples from a tree?	1	2	62
We've driven 3 all the farther / 4 as far as we can.	3	4	63
Treat me 5 as if I were / 6 like I was your sister.	5	6	64
The ship 1 sank / 2 sunk before help could reach it. . .	1	2	65
Do you like 3 whip / 4 whipped cream?	3	4	66
There are 5 less / 6 fewer boys than girls here.	5	6	67
This picture is the 1 better / 2 best of the two.	1	2	68
The explosion had 3 burst / 4 bursted open the door. . .	3	4	69
I 5 reckon / 6 suppose they will serve refreshments.	5	6	70
A bellhop is 1 where a boy / 2 a boy who carries baggage. . . .	1	2	71
Here 3 come / 4 comes your sister and my brother. . . .	3	4	72
At the corner I stopped very 5 sudden. / 6 suddenly.	5	6	73
Does your statement 1 infer / 2 imply that he did it?	1	2	74

Stop.

No. right ( ) × 2 ( )

No. omitted or double-marked ( )

Sum ( )

Subtract 74

DIFFERENCE ----------

DIFFERENCE (R–W)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Gr. score	19	22	25	28	30	33	35	37	39	41	43	45	47	49	50	52	54	56	58	60	62	63	65	66	67	69	70	72	73	74	75	76	78	79	80	82	84	85	86	88

DIFFERENCE (R–W) (Cont'd)	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Gr. score	90	93	96	99	101	104	107	108	109	110	111	112	113	114	115	116	117	118	119	119	120	121	122	123	123	124	124	125	125	126	127	128	128	129

DIRECTIONS: Work an example, and then compare your answer with the answers which follow it. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If you do not find the correct answer, mark the space under the letter for **not given.**

SAMPLES: 51 How many balls are 3 balls and 4 balls? *a* **3** *b* **4** *c* **7** *d* **12** *e* **not given** ..... 51 — *a* *b* *c* ■ *d* *e*

52 How many books are 3 books and 2 books? *f* **2** *g* **3** *h* **4** *i* **6** *j* **not given** ..... 52 — *f* *g* *h* *i* *j*

---

1 Judy has 16 jacks and Hazel has 9. How many more jacks has Judy than Hazel? *a* **7** *b* **9** *c* **16** *d* **25** *e* **not given** 1

2 Mother bakes 24 rolls at a time. How many pans will she need if she bakes 6 in a pan? *f* **4** *g* **18** *h* **24** *i* **30** *j* **not given** 2

3 A strip of paper 19 inches long is to be cut so that one piece will be a foot long. How long will the other piece be? *a* **5 in.** *b* **12 in.** *c* **19 in.** *d* **31 in.** *e* **not given** 3

4 A cake costs 73 cents. How much change will Mother get back if she gives the baker two half dollars? *f* **23¢** *g* **27¢** *h* **37¢** *i* **$1.00** *j* **not given** 4

5 A lock for the clubhouse will cost $1.35. What will be each boy's share if 9 boys share equally? *a* **9¢** *b* **14¢** *c* **15¢** *d* **$12.15** *e* **not given** 5

6 Ruth weighs 78 pounds, Helen weighs 54, and Ann weighs 67. How many pounds will Ann have to gain to weigh as much as Ruth? *f* **11** *g* **13** *h* **24** *i* **78** *j* **not given** 6

7 Ann bought 6 yards of ribbon to tie two packages. For one package she used 3 yards and 2 feet. How much ribbon was left for the other package? *a* **3 yd.** *b* **3 yd. 1 ft.** *c* **3 yd. 2 ft.** *d* **9 yd. 2 ft.** *e* **not given** 7

8 You know how much a man is paid per hour. You know how many hours he worked in a week. To find his earnings for the week, what would you do? *f* **add** *g* **subtract** *h* **multiply** *i* **divide** *j* **not given** .. 8

9 How much would Steve get in all for selling 11 papers at 7¢ each and 3 magazines at 20¢ each? *a* **27¢** *b* **77¢** *c* **$1.27** *d* **$1.37** *e* **not given** 9

10 Each class in a school agreed to collect $\frac{1}{6}$ of 300 cans of food for Thanksgiving baskets. How many cans would each class have to collect? *f* **50** *g* **60** *h* **180** *i* **240** *j* **not given** 10

11 Tom runs errands for 15¢ each. If he averages 15 errands a month, what is his monthly income? *a* **15¢** *b* **30¢** *c* **$1.50** *d* **$2.25** *e* **not given** ... 11

12 The heights of five boys are 60 inches, 67 inches, 66 inches, 62 inches, and 60 inches. If they lined up according to height, how tall would the middle boy be? *f* **60 in.** *g* **62 in.** *h* **63 in.** *i* **66 in.** *j* **not given** .. 12

13 Candy eggs are 2 for 5¢. How many can be bought for 50¢? *a* **10** *b* **20** *c* **25** *d* **30** *e* **not given** 13

14 For a picnic, a class bought 4 dozen buns at 22¢ a dozen and 3 packages of marshmallows at 32¢ a package. How much did the buns and marshmallows cost all together? *f* **88¢** *g* **96¢** *h* **$1.74** *i* **$1.84** *j* **not given** ... 14

Go on to the next page.

15 When the Smiths go to the movies, Jane takes care of their baby and earns 50¢ an hour. How much should she receive for staying one evening from 7 P.M. to 10:30 P.M.?
a 50¢ *b* $1.50 *c* $1.75 *d* $2.50 *e* not given .15 | a | b | c | d | e |

16 A pancake recipe for 6 persons calls for $2\frac{1}{2}$ cups of pancake mix. How many cups will it take for 3 persons? *f* $1\frac{1}{4}$ *g* $1\frac{1}{2}$ *h* $2\frac{1}{2}$ *i* $3\frac{3}{4}$ *j* not given .....16 | f | g | h | i | j |

17 Bill jumped 13 feet 5 inches on Tuesday. On Thursday he jumped 11 feet 9 inches. How much farther did he jump on Tuesday than on Thursday?
a 1 ft. 2 in. *b* 1 ft. 4 in. *c* 1 ft. 6 in. *d* 2 ft. 4 in.
e not given .....17 | a | b | c | d | e |

18 A Scout troop bought 24 uniforms for $194.40. What was the cost per uniform?
f $8.10 *g* $8.95 *h* $9.92 *i* $9.95 *j* not given .18 | f | g | h | i | j |

19 Pine City is 120 miles from Milton. To go from Pine City to Milton by bus takes 4 hours and by train only $2\frac{3}{4}$ hours. How many hours less does it take to go by train?
a $1\frac{1}{4}$ *b* $1\frac{3}{4}$ *c* $2\frac{1}{4}$ *d* $6\frac{3}{4}$ *e* not given .....19 | a | b | c | d | e |

20 How many 1-inch by 2-inch pieces of candy can be cut in a pan which is 8 inches by 10 inches?
f 20 *g* 36 *h* 50 *i* 80 *j* not given .....20 | f | g | h | i | j |

21 Dan says there are 2 quart and 2 pint packages of ice cream for the party. How many people will all of it serve if a pint serves 4 people?
a 4 *b* 12 *c* 16 *d* 24 *e* not given .....21 | a | b | c | d | e |

22 A scale drawing reads "1 inch = 12 inches." A line $3\frac{1}{4}$ inches long on this drawing represents how many actual inches?
f 12 *g* $15\frac{1}{4}$ *h* 27 *i* 39 *j* not given .....22 | f | g | h | i | j |

23 The butcher says to cook a turkey 20 minutes for each pound. At what hour should a 15-pound turkey be started in order to be done at 12 o'clock noon?
a 6 A.M. *b* 8 A.M. *c* 9 A.M. *d* 10 A.M. *e* not given .....23 | a | b | c | d | e |

24 If campers start 2000 forest fires each year and tobacco smokers start 5000, how many times as many fires are started by tobacco smokers as by campers?
f $\frac{2}{5}$ *g* $2\frac{1}{2}$ *h* 5 *i* 10 *j* not given .....24 | f | g | h | i | j |

25 George wants to buy a board to saw into 8 pieces $1\frac{3}{4}$ feet long. If he ignores the waste in sawing, how long will the board have to be?
a $9\frac{3}{4}$ ft. *b* 14 ft. *c* 16 ft. *d* 56 ft. *e* not given .25 | a | b | c | d | e |

26 Mr. Wilson is going to buy 60 pounds of mixed grass seed. He says the mixture should be 1 part clover, 2 parts bluegrass, and 3 parts rye. How many pounds of the mixture will be bluegrass seed?
f 6 *g* 10 *h* 20 *i* 30 *j* not given .....26 | f | g | h | i | j |

27 A club has an income of $50. Of this, $20 is budgeted for food. What per cent does the club budget for food? *a* 10 *b* 20 *c* 25 *d* 40 *e* not given .27 | a | b | c | d | e |

28 If the sales tax is 3%, what is the tax, to the nearest cent, on a coat which costs $27.60?
f 81¢ *g* 83¢ *h* 84¢ *i* 92¢ *j* not given .....28 | f | g | h | i | j |

29 If a man earns $80 in a week and has deductions of 1% for unemployment insurance, $1\frac{1}{2}$% for old-age security, and $12 for income tax, how much does he have left?
a $65.50 *b* $66 *c* $67.80 *d* $67.97 *e* not given .29 | a | b | c | d | e |

30 The speed of sound is about 1100 feet per second. Bob sees lightning and then hears it thunder 20 seconds later. To the nearest mile, how many miles away was the lightning? *f* 4 *g* 6 *h* 8 *i* 10 *j* not given .....30 | f | g | h | i | j |

Go on to the next page.

DIRECTIONS: ...s can be thought out without doing any figuring... answer and mark the answer space that is lettered...

31 Without working, ...e one in which the quotient will be largest.
a 19)940 *b* 19)934 *c* 19)934 *d* 19)937 ..... 31 | *a* | *b* | *c* | *d*

32 In which number is the 8 in ...eds position?
e 1089 *f* 1980 *g* 9801 *h* 1908 ..... 32 | *e* | *f* | *g* | *h*

33 Which is the smallest fraction?
a $\frac{1}{10}$ *b* $\frac{1}{50}$ *c* $\frac{1}{100}$ *d* $\frac{1}{5}$ ..... 33 | *a* | *b* | *c* | *d*

34 Without measuring, tell how many inches long this line is. ———
e 1 *f* 2 *g* 3 *h* 4 ..... 34 | *e* | *f* | *g* | *h*

35 How much is 19.7 rounded off to the nearest whole number?
a 19 *b* $19\frac{7}{10}$ *c* 20 *d* 197 ..... 35 | *a* | *b* | *c* | *d*

36 A loan which has real estate to guarantee its payment is —
e interest *f* stock *g* capital *h* a mortgage ..... 36 | *e* | *f* | *g* | *h*

37 A kind of insurance which protects against lawsuits for damage is —
a annuity *b* liability *c* theft *d* marine ..... 37 | *a* | *b* | *c* | *d*

38 By estimation, choose the example which will have the smallest product.
e 806 / 4.50 *f* 8.06 / 45.0 *g* 80.6 / 4.50 *h* 8.06 / 4.50 ..... 38 | *e* | *f* | *g* | *h*

39 $\sqrt{64}$ = *a* 8 *b* 32 *c* 64 *d* 4096 ..... 39 | *a* | *b* | *c* | *d*

40 How much is 150% of 20?
e 3 *f* 7.5 *g* 30 *h* 75 ..... 40 | *e* | *f* | *g* | *h*

41 Which line is horizontal?
a | *b* / *c* \ *d* ——— ..... 41 | *a* | *b* | *c* | *d*

42 If *b* is the base of a triangle and *a* is its altitude, the area of the triangle is —
e $\frac{1}{2}ab$ *f* ab *g* $a+b$ *h* $2ab$ ..... 42 | *e* | *f* | *g* | *h*

43 17.5% is equal to the decimal —
a .175 *b* 1.75 *c* 17.05 *d* 17.50 ..... 43 | *a* | *b* | *c* | *d*

44 By estimation, choose the example whose quotient will be smaller than 1.
e 126)127 *f* 138)137.2 *g* 156.3)157 *h* 125)125 ..... 44 | *e* | *f* | *g* | *h*

45 Which is the same as "4 less than 5 times a number = 21"?
a $4-5=21N$ *b* $\frac{5N}{4}=21$ *c* $21\times5-4=N$
d $5N-4=21$ ..... 45 | *a* | *b* | *c* | *d*

Stop.

No. right	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Gr. score	23	26	29	31	33	36	38	40	42	44	46	48	50	52	54	56	58	60	61	63	65	67	69	71	73	75	77	79	81	84	86	89	92	95	98	101	104	107	110	113	117	120	123	127	129

TEST 6 *Arithmetic Computation*

DIRECTIONS: Work each example. Then compare your answer with the answers given at the right of the example. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If the correct answer is not given, mark the answer space under the letter for **not given.** Look carefully at each example to see what it tells you to do. If you need to do any figuring, use a separate sheet of paper.

1 Multiply $\begin{array}{r} 450 \\ \underline{\times\ 7} \end{array}$ — *a* 3050 *b* 3100 *c* 3150 *d* 3157 *e* not given . . . 1 (a b c d e)

2 Add $\begin{array}{r} \$4.80 \\ \underline{+\ 9.65} \end{array}$ — *f* $13.45 *g* $13.55 *h* $14.55 *i* $15.45 *j* not given . . 2 (f g h i j)

3 Subtract $\begin{array}{r} \$5.00 \\ \underline{-\ 4.48} \end{array}$ — *a* $.52 *b* $.62 *c* $1.48 *d* $1.52 *e* not given . . 3 (a b c d e)

4 $43\overline{)86}$ — *f* 2 *g* 3 *h* 11 *i* 20 *j* not given . . . . . 4 (f g h i j)

5 Add $\begin{array}{r} 854 \\ 759 \\ 47 \\ \underline{+\ 36} \end{array}$ — *a* 1686 *b* 1696 *c* 1706 *d* 1796 *e* not given . . . . . 5 (a b c d e)

6 Multiply $\begin{array}{r} 75 \\ \underline{\times\ 14} \end{array}$ — *f* 89 *g* 1010 *h* 1040 *i* 10,520 *j* not given . . . . 6 (f g h i j)

7 Subtract $\begin{array}{r} 871{,}653 \\ \underline{-\ 396{,}785} \end{array}$ — *a* 474,868 *b* 475,868 *c* 484,968 *d* 485,868 *e* not given . . . . . 7 (a b c d e)

8 $34\overline{)748}$ — *f* $19\frac{2}{34}$ *g* 22 *h* $24\frac{15}{17}$ *i* 112 *j* not given . . . . . 8 (f g h i j)

9 Multiply $\begin{array}{r} 310 \\ \underline{\times\ 203} \end{array}$ — *a* 613 *b* 7130 *c* 62,930 *d* 64,960 *e* not given . . 9 (a b c d e)

10 Subtract $\begin{array}{r} 8\frac{1}{10} \\ \underline{-\ 7\frac{5}{6}} \end{array}$ — *f* $1\frac{4}{15}$ *g* $1\frac{7}{10}$ *h* $1\frac{14}{15}$ *i* $15\frac{14}{15}$ *j* not given . . . . . 10 (f g h i j)

11 Add $\begin{array}{r} \frac{1}{6} \\ \underline{+\ \frac{1}{6}} \end{array}$ — *a* $\frac{1}{12}$ *b* $\frac{1}{3}$ *c* 1 *d* 2 *e* not given . . . . . 11 (a b c d e)

12 $\frac{1}{4} \times \frac{3}{4} =$ — *f* $\frac{1}{4}$ *g* $\frac{1}{3}$ *h* $\frac{3}{8}$ *i* $\frac{3}{4}$ *j* not given . . . . . 12 (f g h i j)

13 $6 \div \frac{2}{5} =$ — *a* $\frac{1}{15}$ *b* $\frac{3}{5}$ *c* 3 *d* 15 *e* not given . . . . . 13 (a b c d e)

14 4% of $800 = — *f* $32 *g* $200 *h* $320 *i* $804 *j* not given . . . . 14 (f g h i j)

15 Add $\begin{array}{r} \frac{3}{4} \\ \frac{1}{3} \\ \underline{+\ 2\frac{1}{12}} \end{array}$ — *a* $2\frac{1}{6}$ *b* $2\frac{5}{12}$ *c* $3\frac{1}{6}$ *d* $3\frac{1}{2}$ *e* not given . . . . . 15 (a b c d e)

Go on to the next page.

16 $.2 \times .12 =$ *f* .024 *g* .06 *h* .6 *i* 24 *j* not given ..... 16 (f g h i j)

17 Add 4474.59 / 7668.98 / 90.67 / 698.56 *a* 12,022.80 *b* 12,822.90 *c* 12,931.80 *d* 12,932.80 *e* not given ..... 17 (a b c d e)

18 $6\overline{)5424}$ *f* 84 *g* 94 *h* 904 *i* 940 *j* not given ..... 18 (f g h i j)

19 Selling Price = $250 / Rate of Commission = 4% / Commission = ? *a* $10 *b* $100 *c* $240 *d* $254 *e* not given ..... 19 (a b c d e)

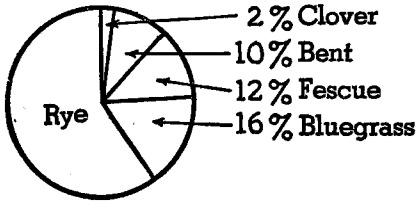
20 $8\overline{).16}$ *f* .002 *g* .2 *h* 2 *i* 20 *j* not given ..... 20 (f g h i j)

21 Subtract $3\frac{2}{3}$ / $3\frac{1}{5}$ *a* 0 *b* $\frac{1}{3}$ *c* $\frac{7}{15}$ *d* $6\frac{13}{15}$ *e* not given ..... 21 (a b c d e)

22 $4\frac{2}{3} \times 3\frac{3}{4} =$ *f* $7\frac{1}{2}$ *g* 12 *h* $12\frac{1}{2}$ *i* 15 *j* not given ..... 22 (f g h i j)

23 If $d + 5 = 15$, $d =$ *a* 3 *b* 10 *c* 20 *d* 75 *e* not given ..... 23 (a b c d e)

24 $\frac{5}{8} \div \frac{3}{10} =$ *f* $\frac{3}{16}$ *g* $\frac{4}{9}$ *h* $\frac{12}{25}$ *i* $2\frac{1}{12}$ *j* not given ..... 24 (f g h i j)



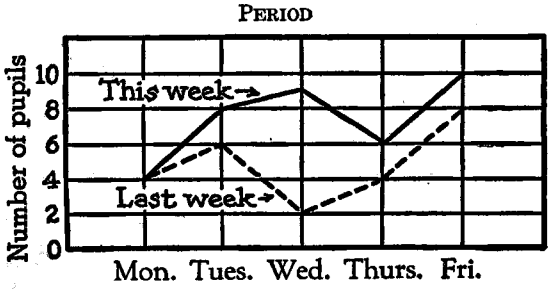
A Grass Seed Mixture

25 What per cent of the grass seed is rye?
a 38% *b* 40% *c* 60% *d* 62% *e* not given ..... 25 (a b c d e)

26 How many times as much bluegrass is there as clover?
f 2 *g* 8 *h* 16 *i* 18 *j* not given ..... 26 (f g h i j)

27 Subtract 11 ft. 4 in. / 8 ft. 8 in. *a* 2 ft. 6 in. *b* 2 ft. 8 in. *c* 3 ft. 4 in. *d* 20 ft. 0 in. *e* not given ..... 27 (a b c d e)

28 Add 4 hr. 27 min. / 4 hr. 36 min. / 3 hr. 38 min. *f* 11 hr. 41 min. *g* 12 hr. 1 min. *h* 12 hr. 31 min. *i* 12 hr. 51 min. *j* not given ..... 28 (f g h i j)



29 On which day of these two weeks were the most pupils absent?
a Tues. *b* Wed. *c* Thurs. *d* Fri. *e* not given ..... 29 (a b c d e)

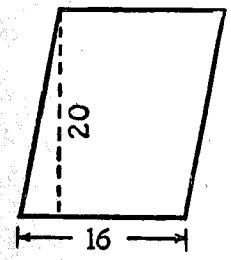
30 How many more pupils were absent on Wednesday of this week than on Thursday of last week?
f 2 *g* 5 *h* 6 *i* 9 *j* not given 30 (f g h i j)

31 Find the average 16 ft. / 32 ft. / 12 ft. *a* 12 ft. *b* $12\frac{1}{2}$ ft. *c* 16 ft. *d* 20 ft. *e* not given 31 (a b c d e)

Go on to the next page.

32 $.4\overline{)3}$ *f* .075 *g* $\frac{3}{4}$ *h* .75 *i* 7.5 *j* not given..... 32 f g h i j

33 Add 21 m. 66 cm. / 32 m. 72 cm. *a* 53 m. 38 cm. *b* 54 m. 38 cm. *c* 65 m. 8 cm. *d* 66 m. 8 cm. *e* not given..... 33 a b c d e



34 If $A = bh$, what is the area of the parallelogram shown at the left? *f* 32 *g* 36 *h* 160 *i* 1620 *j* not given..... 34 f g h i j

35 If 10% of an amount is 25¢, what is the amount? *a* 2.5¢ *b* 25¢ *c* 40¢ *d* $2.50 *e* not given..... 35 a b c d e

36 $\frac{2}{6} = \frac{1}{?}$ *f* 3 *g* 5 *h* 7 *i* 12 *j* not given..... 36 f g h i j

37 If $5r + 2 = 37$, $r =$ *a* 5 *b* 7 *c* 30 *d* 35 *e* not given..... 37 a b c d e

38 Assessed Valuation = $2000
Tax Rate per $100 = $4.50
Amount of Tax = ? *f* $9 *g* $15.50 *h* $90 *i* $2450 *j* not given.. 38 f g h i j

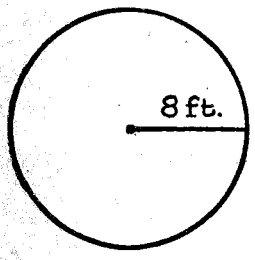
39 $\frac{-24}{-3} =$ *a* −24 *b* −8 *c* 8 *d* 21 *e* not given..... 39 a b c d e

40 Multiply $-3y$ by -4 *f* $12y$ *g* $-12y$ *h* 12 *i* −12 *j* not given.... 40 f g h i j

41 Principal = $400
Annual Interest = $20
Rate of Interest = ? *a* .4% *b* 2% *c* 5% *d* 40% *e* not given 41 a b c d e

42 If $\frac{B}{2} = 16$, $B =$ *f* 14 *g* 16 *h* 18 *i* 32 *j* not given..... 42 f g h i j

43 Principal = $400
Rate = 3%
Time = 9 mo.
Interest = ? *a* $1.33 *b* $9 *c* $12 *d* $108 *e* not given..... 43 a b c d e



44 If $A = \pi r^2$, what is the area of the circle shown at the left? ($\pi = 3.14$) *f* 24.12 sq. ft. *g* 50.24 sq. ft. *h* 198.24 sq. ft. *i* 200.96 sq. ft. *j* not given..... 44 f g h i j

Stop.

No. right	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Gr. score	21	28	31	33	35	38	40	43	45	47	49	51	53	55	57	59	61	62	64	66	67	69	70	72	74	76	78	79	81	84	86	89	92	96	100	104	107	111	114	117	120	123	126	129

STANFORD ACHIEVEMENT TEST

Inter. & Adv. Partial Batteries
Forms J, K, L, M, and N

TRUMAN L. KELLEY · RICHARD MADDEN · ERIC F. GARDNER · LEWIS M. TERMAN · GILES M. RUCH

Directions for Administering

Contents

1 Description of the Stanford Series

Stanford Achievement Test is the designation of a series of comprehensive achievement tests designed to measure the important knowledges, skills, and understandings commonly accepted as desirable outcomes of the major branches of the elementary curriculum. The tests are intended to provide to teachers, supervisors, administrators, and others concerned with the growth and development of elementary school pupils, dependable measures of these outcomes, comparable from subject to subject and grade to grade, for use in connection with improvement of instruction, pupil guidance, and evaluation of progress. The tests have been planned with a view toward simplicity of administration, scoring, and interpretation, so that they may be used effectively by persons with little or no formal training in the use of standard tests.

The first edition of *Stanford Achievement Test*, consisting of Forms A and B, was issued in 1923. A thorough revision of this original edition resulted in the publication in 1929 of a second edition, known as *New Stanford Achievement Test*, Forms V, W, X, Y, and Z. This edition was in turn superseded in 1940 by entirely new forms D, E, F, G, and H. The present edition of *Stanford Achievement Test*, comprising Forms J, K, L, M, and N, is, therefore, the fourth in the series of *Stanford Achievement Tests*. These periodic revisions, each amounting in effect to the production of an entirely new group of tests, have been undertaken to insure that the content of the tests may continue to be closely attuned to what is actually being taught in the schools; that the normative data may reflect accurately the current accomplishments of pupils of varying grades and ages; that the tests may keep abreast of those improvements in measurement theory and technique that permit more reliable appraisal and more convenient use; and that dangers arising from over-familiarity of test content as a result of repeated use may be avoided.

The present edition of *Stanford Achievement Test* is organized in four levels, or batteries, for various grades and covering various subjects, as follows:

Primary Battery for use at the end of Grade 1, in Grade 2, and in the first half of Grade 3. The Primary Battery includes, in a single 8-page booklet, five tests:

Paragraph Meaning	Arithmetic Reasoning
Word Meaning	Arithmetic Computation
Spelling	

Elementary Battery for Grades 3 and 4. The Elementary Battery includes, in a single 12-page booklet, six tests:

Paragraph Meaning	Language
Word Meaning	Arithmetic Reasoning
Spelling	Arithmetic Computation

Intermediate Battery Complete for Grades 5 and 6, and *Advanced Battery Complete* for Grades 7, 8, and 9. Each of these batteries is printed in a 24-page booklet, and includes nine tests:

Paragraph Meaning	Arithmetic Computation
Word Meaning	Social Studies
Spelling	Science
Language	Study Skills
Arithmetic Reasoning	

Published by World Book Company, Yonkers-on-Hudson, New York, and Chicago, Illinois

PRINTED IN U.S.A. SAT : DA : INTER. & ADV. PARTIAL—1

The Intermediate and Advanced tests are available in *Partial Batteries*, each of which includes, in a single 16-page booklet, the Paragraph Meaning, Word Meaning, Spelling, Language, Arithmetic Reasoning, and Arithmetic Computation tests. The reading tests and the arithmetic tests of the Elementary, Intermediate, and Advanced batteries also are published as separate booklets.

The Intermediate and Advanced Partial Batteries are available in a special edition designed for use with separate answer sheets which may be scored on the IBM Test Scoring Machine (or by hand). The tests in this special edition have the same content as the corresponding tests in the regular edition. These machine-scorable forms are designated Forms JM, KM, etc. The Social Studies, Science, and Study Skills tests are also available as separate tests, in the separate-answer-sheet version only.

The grades indicated for the several batteries are the grades for which the batteries are most appropriate in the great majority of school systems. There are, however, schools, or individual classes, in which achievement is so markedly superior (or inferior) to the typical level as to make it advisable to use in a given grade the battery designated for a higher (or lower) grade.

The five forms J, K, L, M, and N of the various tests are matched for content and difficulty, represent equally good measures of the respective subjects, and yield directly comparable results.

In the case of several tests, there is some overlapping or identity of content between adjacent batteries — that is, a question which appears, for example, in the Elementary level of a test may also appear in the Intermediate level of the same test. In almost all instances of such repetition, the question appears in the same form (J, K, etc.) of the two batteries. Because of this overlapping, it is prudent to use a different form of the test when pupils are retested at an interval of a year or less, even though different batteries are used.

The availability of five equivalent forms of *Stanford* is a decided advantage for systems which are conducting or plan to conduct a continuing program of annual testing. Annual testing, or even twice-yearly testing at the beginning and end of the school year, can be conducted without the necessity for re-administering the same form of a given battery to any pupils.

Although almost all tests in the several batteries are time-limit tests, the time limits are provided as matters of administrative convenience rather than for the purpose of placing any premium upon speed of work. The time limits in all cases are generous and calculated to give practically all pupils sufficient time to attempt all questions which they are capable of answering correctly. The tests, therefore, are fundamentally power tests and not speed tests.

Relation of Present Edition to Preceding Edition

Attention of users familiar with the preceding edition (Forms D to H) is invited to the following brief summary of ways in which the present edition differs from the earlier one:

a. The content of the present edition is almost entirely new, with extremely few items carried forward from the preceding edition. Where duplication occurs, it is only because the items from the 1940 edition which were tried out in connection with development of the new forms proved still to be highly valid and discriminating items.

b. Four batteries or levels are provided, in contrast to the three levels provided in the 1940 edition. This change reduces the range of achievement that must be covered by any battery, thereby permitting inclusion of a higher proportion of functioning content in each battery.

c. The Primary Battery is now designed for use at the end of Grade 1, Grade 2, and the beginning of Grade 3, while the 1940 edition was not intended for use before Grade 2.

d. A Study Skills Test is included in the present edition, in recognition of the increased attention being devoted to these skills in today's schools.

e. In the Arithmetic Reasoning Test at all levels, a section on meanings has been added. It consists chiefly of items on number relations, but includes some on informational background.

f. The Language Test now includes items in capitalization, punctuation, and sentence sense.

g. The two social studies tests of the 1940 edition have been combined into a single social studies test in the present edition.

h. No literature test is included in the present edition, since the great diversity of literature curricula and objectives from school to school make it difficult to develop a single test of wide applicability.

i. At the Intermediate and Advanced levels changes have been made in the type of question used so that these batteries in the new version are now completely objective. and hence more easily and accurately scored.

With respect to comparability of performance on the present and previous editions, tables are available which permit conversion of scores on the earlier edition to equivalent scores on the present edition, and vice versa. Thus continuity of results is assured for users as they change from the earlier to the present edition. The comparability of scores from the two editions was determined in a special study conducted for this purpose, in which Form J and Form D were administered to matched groups of pupils, and equivalent scores derived.

2 Content of the Intermediate and Advanced Partial Batteries

The Intermediate and Advanced Partial Batteries measure reading, arithmetic, language, and spelling. Reading is measured by means of two tests; Paragraph Meaning and Word Meaning. Arithmetic is measured by means of two tests, Arithmetic Reasoning and Arithmetic Computation. Language and Spelling are each measured by means of a single test. The nature and content of these several tests are briefly described below.

Stanford Achievement Test is highly analytical among subjects, but it makes no claim for accurate diagnosis within a given subject. Part scores based upon selected items from a test or upon unit sections of a test may be satisfactory for group diagnosis even though not sufficiently reliable for individual diagnosis.

Teachers should not attach undue importance to a pupil's error on any single item or small groups of items. This is not to say that a teacher may not gain insight into a pupil's needs by going over his test record item by item, or a group's needs by analysis of a few items, and following by discussing with the pupils the reasons for the incorrect responses.

Paragraph Meaning

The Paragraph Meaning Test consists of a series of paragraphs, graduated in difficulty, from each of which two or more words have been omitted. The pupil's task is to demonstrate his comprehension of the paragraph by selecting the proper word for each omission from four choices that are afforded him. The test thus provides a functional measure of the pupil's ability to comprehend connected discourse involving levels of comprehension varying from extremely simple recognition to the making of inferences from several related sentences. Special efforts have been made to devise paragraphs interesting to pupils, and to make certain that the level of vocabulary is such that the test does not become one of word knowledge rather than of comprehension of connected discourse. The authors have attempted to emphasize the notion of "reading as reasoning" and, accordingly, have constructed exercises that place a premium on genuine comprehension of the material read.

Use of the multiple-choice type of item employed in this test eliminates the element of subjectivity to be found in tests of a completion or fill-in type.

Paragraph meaning is such a vital part of school achievement that ability in it should be carefully weighed against the achievement level desired of each pupil. The pattern for diagnosis, including study of emotional and social adjustment, mental ability, health, word recognition, word attack procedures, vision, etc., is too complex to be covered in the space available here, but it is treated extensively in books on reading diagnosis.

Word Meaning

Because of the central importance of word knowledge as an indispensable basis for acquisition of reading skill and of almost all kinds of information, word meaning has been judged deserving of measurement by means of a separate test. In addition to items measuring knowledge of synonyms, of simple definitions, and of ready associations, there are included items designed to measure higher-level comprehension of the concepts represented by words, and fullness of understanding of terms. For example, Item 3 in Form J of the Intermediate Battery reads

> Mary Smith and John Doe are cousins if they have the same
>
> **grandmother mother sister daughter**

Here obviously is a way of testing for knowledge of the relation between "cousin" and "grandmother" that requires a higher order of understanding than would simple definition of either term.

The selection of words for inclusion in this test was based on considerations of the frequency of occurrence of the words in pupils' usage and in material which they read. The appropriateness of all words included, either as stimulus words or as alternative responses, was checked by reference to the available word counts.

Word meaning is an important area in the realm of human achievement. It spans the verbal life of a pupil and reflects not only his school achievement but also his home background. Weakness indicates the need for broadened experiences and often for increased language expression by the pupil.

Spelling

The Spelling Test consists of 72 multiple-choice questions in which the pupil chooses the correct spelling from among three possible spellings or marks "NG" if the correct spelling is not given. While this type of spelling test requires the identification of correct spelling rather than the writing of the proper spelling of a word, it yields results which correlate substantially with results of dictation-type tests. Spelling from dictation cannot be defended as an alternative that is lifelike. The multiple-choice item also eliminates the examiner's pronunciation of a word as an aid to the pupils in spelling. More words can be tested per unit of testing time in the multiple-choice form than in the dictation-type test. The authors discount the likelihood that brief exposure of pupils to misspellings of 72 words will have any tendency to fix the incorrect spellings in the pupils' minds.

Some pupils may need to know how to spell but a few hundred words, while others require 10,000 to 15,000. Ninety per cent of all writing is done with approximately 2000 different words. A spelling test should sample these 2000 words adequately, but if it is to discriminate among the better spellers, it must draw from words less frequently used. Approximately 50% of the words in the Intermediate Battery come from the first 2000 words of pupils' usage, which num-

ber is adequate to measure the spelling ability of pupils with limited writing vocabularies. The remainder are selected from words beyond the first 2000.

Language

The Language Test consists of exercises in capitalization, punctuation, sentence sense, and language usage, with a few additional items of grammar in the Advanced Battery. The exercises in capitalization, punctuation, and sentence sense are presented in connected discourse. This adds interest and provides a more natural testing situation than is achieved with isolated sentences. In all items a correct and an incorrect, or much less acceptable, usage are presented as options. The authors have no fear that one reading of an incorrect usage in a test, as contrasted with hundreds of readings of the correct usage in other situations, will tend to fix the incorrect usage in pupils' minds.

The two-choice type of item seems particularly well suited for the measurement of the language skills covered by this test, since in actual written and spoken language the choice of usage, punctuation, or capitalization so often rests between two possibilities. The most valid test of a person's ability to punctuate and capitalize is, of course, the extent to which in his own writing he does these things correctly. For the sake of simplification of measurement and scoring it is necessary to test these skills in a somewhat artificial fashion, perhaps with some loss of validity. Within the limits of objective measurement at these grade levels, however, it is believed that the Language Test affords a valid appraisal of mastery of those aspects of language which the test purports to cover.

The importance of standards of usage must be granted for a language which is the medium of communication in all parts of a large nation. Colloquialisms which may be very serviceable in a limited area cannot be credited in a nation-wide test. It must be recognized, however, that modern usage is occasionally at variance. Items on matters that are highly controversial have been avoided, but if every item about which there is some disagreement were to be excluded, there would be little left to test. Tradition has been the standard of correctness up to the point where controversy makes tradition untenable. Items beyond that have not been selected for use. As long as language usage is changing, there will be occasion for argument within the transition zone.

Language Test scores reflect a combination of home background, curriculum content, and possibly of intensity and persistency of instruction. Each school will need to judge first of all the language background of its pupils. In the light of the conclusions, it may gauge the scope of its language problem and estimate the possible degrees of improvement. Capitalization and punctuation skills and sentence sense are more amenable to change through instruction than is word usage, because of its closer relationship to out-of-school practice.

Arithmetic Reasoning

The Arithmetic Reasoning Test is divided into two parts. Part I measures reasoning with problems taken from life experiences. The general reading vocabulary has been kept much below the problem-solving level being measured. Computation difficulty has been controlled so that it is only a minor factor.

To be sure that the test would be representative of the many kinds of arithmetic problems that confront pupils, each of the 30 problems in Part I was classified (1) in accordance with the four fundamental processes of addition, subtraction, multiplication, and division; and (2) in accordance with the kinds of measures used; namely, space (linear, area, volume), weight, time, temperature, and value. Problems of the various types were assigned to the two batteries in amounts judged to be appropriate in light of observed curricular practice.

Though most problems were written in the form of a simple direct statement and question, some were tried out with extra numbers, without numbers, with two denominations of measures, with "hidden" numbers, and in other ways commonly used to stimulate reasoning. Very few of any type other than the direct statement and question survived the tryout of items.

Part II tests two essential components of the ability to reason in arithmetic; namely, the informational background of pupils and their understanding of the number system.

Arithmetic reasoning involves a combination of arithmetic information, ability to read, the thinking aspects of problem solving, some ability in computation, and other factors which are merged into one score. General deficiency in this test, as in arithmetic computation, suggests shortcomings of performance, perhaps of instruction, which are as yet unidentified. Low test scores indicate possibilities so numerous and varied that the total range of teaching procedures in arithmetic should be reëxamined.

Arithmetic Computation

The Arithmetic Computation Test measures proficiency in the computational skills appropriate for Grades 5 through 9. The tests are in multiple-choice form; the response "not given" is included as one of the choices in each question in order to discourage guessing by pupils not able to perform the required operations. Both Intermediate and Advanced tests include items on reading of tables and graphs, but these skills are more comprehensively covered in the Study Skills Test. The time limit for the test is generous, reducing the emphasis on computational speed.

The five forms are closely parallel in content in that each form consists of the same major types of exercises. Most major types of examples may be subdivided into several variants or minor types, and advantage was taken of this fact to avoid a rigid patterning from form to form. This variation makes the tests less susceptible to coaching.

3 Directions for Administering

GENERAL DIRECTIONS FOR ADMINISTERING

NOTE. The examiner should become thoroughly familiar with all of the following directions before attempting to give the test.

1. Before beginning a test, the examiner should see that the desks are cleared and that each pupil has one or two sharpened pencils. Pens should not be used. A supply of extra pencils should be at hand. Scratch paper should be provided for use with the Arithmetic Reasoning Test and the Arithmetic Computation Test.
2. A natural classroom situation should be maintained as far as possible.
3. Provision should be made to insure quiet and freedom from interruptions of any kind. This may be accomplished by posting on the door of the room a sign reading, "Testing. Do not disturb."
4. The examiner should take pains to insure that the pupils understand what they are to do in each test and how they are to record their answers. This can be done best by reading the directions verbatim and supplementing with explanations as questions from the pupils indicate need. When doing this, the examiner should never give help on specific test questions, but may fully clarify the directions.
5. After a test has been started, the examiner should move quietly about the room to see that instructions are being followed. When they are not, clarify for the individual pupil but do not disturb the entire class unless the misunderstanding seems general.
6. Time limits should be adhered to rigidly. A stop watch or a watch with a second hand should be used in order to guarantee a uniformity of time. If an ordinary watch is used, it is necessary to exercise great care to insure accurate timing. It is advisable to record the starting time in hours, minutes, and seconds on the board or on note paper and the time when the test is to be finished.
7. The examiner should take every precaution to see that the pupils do not turn to any test other than the one the class is working on at the time.
8. Every effort must be made to prevent pupils from helping each other. Otherwise a true picture cannot be obtained of the extent of pupil achievement or of pupil difficulties and the reasons for them. Arranging the situation so that pupils cannot copy from each other is far better than reminding them constantly that they are not to look at each other's papers.
9. Each of the six tests may be administered at a separate sitting, or the tests may be administered in four sittings in accordance with the proposed schedule given below:

First Sitting			
Distributing booklets, recording names, reading directions, providing rest period between tests, etc.			7 min.
Test 1.	Paragraph Meaning	Work time	25 min.
Test 2.	Word Meaning	Work time	12 min.
		Total	44 min.
Second Sitting			
Distributing booklets, reading directions, etc.			5 min.
Test 3.	Spelling	Work time	15 min.
Test 4.	Language	Work time	16 min.
		Total	36 min.
Third Sitting			
Distributing booklets, reading directions, etc.			3 min.
Test 5.	Arithmetic Reasoning	Work time	35 min.
		Total	38 min.
Fourth Sitting			
Distributing booklets, reading directions, etc.			3 min.
Test 6.	Arithmetic Computation	Work time	35 min.
		Total	38 min.

Since these are not speed tests, time limits may be generous for some classes. If all pupils or all but one or two in a class finish a test before the stipulated time has elapsed, time may be called. *Under no conditions* should the time limits be extended.

10. The entire battery should *not* be given in one day. *Under no conditions* should a test be started unless sufficient time is available to complete it.

SPECIFIC DIRECTIONS

To administer the test, say to the pupils: **"This is a test to show how much you have learned. When you get your test booklet, do not write on it or open it until I tell you to."** (Be sure pupils do not open booklets.)

Pass out the test booklets. Then say: **"Now look at the front page, where it says *Name*.** (Point to the proper place.) **Write your first and last names here. Do it as quickly as you can and write plainly."** (Pause.) Give similar instructions for the other items of information on the front page.

After the blanks have been filled in, continue: **"Now listen carefully to what I tell you. You must do your best, but I do not expect you to be able to answer all the questions. Do not begin until I say *Go*, and when I say *Stop* put your pencil right down. If you break your pencil, hold up your hand and I will give you another. After we have begun, you must not ask questions."** (Continue with the directions for Test 1, given below.)

First Sitting — Test 1. *Paragraph Meaning*

Say to the pupils: **"Now open your booklet to Test 1, Paragraph Meaning, which is on page 2.** (See that all pupils have the correct page.) **Now fold the page back, like this, so that only page 2 is showing.** (Demonstrate and see that all do this correctly.)

"Look at the top of the page, where it says 'DIRECTIONS.' (Hold up a booklet and point to the proper place.)

The directions tell you what to do. They say: 'Read each paragraph below. Decide which of the numbered words at the right is best for each blank, and then mark the answer space which is numbered the same as the word you have chosen. Study the sample below, and answer the other questions in the same way.'

"Now look at the sample paragraph. (Hold up a booklet and point to the sample.) **It says: 'I am shorter than my sister and taller than my brother. This morning we stood beside one another. I looked down at my ____ and ____ at my sister.' What word goes in the space which has the number 51 in it?** (Encourage reply.) **Yes, the word that belongs in the space is 'brother.' Do you find 'brother' among the four words given for blank number 51 at the right?** (Pause.) **Notice that 'brother' has the number 2; so the answer space under the number 2 has been filled in.** (Point.) **What word belongs in the space numbered 52?** (Encourage reply.) **Yes, the missing word is 'up.' Do you find the word 'up' among the four words given for blank number 52? What is its number?** (Encourage group to answer aloud as before.) **Yes, 'up' has the number 7; so fill in the answer space under the number 7. All the paragraphs on this page have one or more words left out. Each space with a number in it tells you where a word has been left out. For each space there is a group of words beside the same number as appears in the space. The word that goes in each space is one of the words in the group that has the same number as the number in the space.**

"You are to read each paragraph and find the words that have been left out. Begin with the first paragraph and answer as many questions as you can. When you are not sure which answer is the right one, make the best choice you can, but do not make wild guesses. When you reach the bottom of the page, go on to pages 3 and 4. When you finish page 4, go back and see if you have done the best you can. Do not work on any other tests. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After *25 minutes*, say: **"STOP!"** (Allow pupils about 2 minutes of relaxation before starting to administer Test 2, Word Meaning.)

First Sitting (*Cont'd*) — TEST 2. *Word Meaning*

"Now turn to the next test on page 5, which is Test 2, Word Meaning. (Pause until all have found the place.) **Now fold the page back, like this, so that only page 5 is showing."** (See that all do this correctly.) Then say: **"Look at the top of the page, where it says 'DIRECTIONS.'** (Hold up a booklet and point to the proper place on the booklet.) **The directions tell you what to do. They say: 'In each exercise decide which of the four numbered words will complete the sentence best. Look at the number of this word. Mark the answer space at the right which is numbered the same as the word you have chosen. Study the samples.'**

"Now look at the samples. (Hold up a booklet and point to the sample exercises.) **The first sample, which is number 51, says: 'The day that comes after Friday is — Monday, Tuesday, Saturday, Sunday.' Which of the last four words makes the sentence true? — The day that comes after Friday is . . .** (Wait for class to answer.) **Yes, the day is 'Saturday.' The number beside 'Saturday' is 3, so the answer space under the number 3 has been filled in. Now look at the second sample. It says: 'To draw on a blackboard, use a piece of — pencil, straw, eraser, chalk.' Which of the last four words makes the sentence true? To draw on a blackboard, use a piece of . . .** (Wait for the class to answer.) **Yes, 'chalk' is right. The number beside 'chalk' is 8, so you fill in the answer space under the number 8.** (See that all do this correctly.) **In each sentence on this page and the next page, decide which is the right answer and fill in the space below the number of the word you have picked.**

"Begin with question number 1 and answer as many questions as you can. When you are not sure which answer is the right one, make the best choice you can, but do not make wild guesses. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After *12 minutes*, say: **"STOP! Put your pencil down."** Collect the test booklets immediately. (The first sitting should end here.)

Second Sitting — TEST 3. *Spelling*

When the second sitting begins, make sure that each pupil has his own booklet.

After the booklets have been distributed, say to the pupils: **"Now open your booklet to Test 3, Spelling, which is on page 7.** (See that all pupils have the correct page.) **Now fold the page back, like this, so that only page 7 is showing.** (Demonstrate and see that all do this correctly.) **Look at the top of the page, where it says 'DIRECTIONS.'** (Hold up a booklet and point to the proper place on the booklet.) **The directions tell you what to do. They say: 'In each exercise below, one of the words is spelled in three different ways. If the correct spelling is there, mark the answer space which has the same number as the correct spelling. If the correct spelling is not given as one of the three spellings, mark the answer space under NG as the right answer; NG stands for not given.'**

"Now look at the samples. The first sample says: 'The color is 1 r-i-d 2 r-e-d 3 r-u-d.' Which is the correct spelling? (Encourage replies.) **Yes, number 2, 'r-e-d,' is correct. So the answer space under the number 2 has been darkened in the correct manner. Now study the second sample. Which spelling is correct?** (Encourage replies.) **Yes, the correct spelling is not given, so you fill in the space under NG.** (See that all do this correctly.)

"For each question on this page and the next one, decide which is the correct spelling and make a mark in the answer space under the number of the correct response, or under NG if the correct spelling is not given.

"Begin with question number 1 and answer as many questions as you can. When you are not sure which

answer is the right one, make the best choice you can, but do not make wild guesses. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After *15 minutes*, say: **"STOP!"** (Allow pupils about 2 minutes of relaxation before starting to administer Test 4, Language.)

SECOND SITTING (*Cont'd*) — TEST 4. *Language*

NOTE. *Different directions are required for the Intermediate and Advanced Batteries: Language.*

INTERMEDIATE — GRADES 5 AND 6

"Now turn to the next page (page 9), which is Test 4, Language. (Pause until all have found the place.) **Now fold the page back, like this, so that only page 9 is showing.** (Demonstrate and see that all do this correctly.) **Look at the top of the page, where it says 'DIRECTIONS.'** (Hold up a booklet and point to the proper place on the booklet.) **The directions tell you what to do. They say: 'In each pair of words in heavy type there is an error in either capitalization or punctuation. You are to decide which one of each pair has the correct capitalization and punctuation. Then mark the answer space at the right that has the same number as the correct form.' Look at the first sample. It says: 'This is 1 mr. Jones,' with a small M in Mr., '2 Mr. Jones' with a capital M in Mr. The second form is right, since 'Mister' should have a capital M; so the answer space under number 2 has been filled in. Now look at the second sample. It says: 'St. Louis, Missouri.' 'St. Louis Missouri' is written twice, once with a comma after 'Louis' and once without a comma. Which is correct?** (Pause for reply.) **Yes, form 3 which has the comma is correct; so fill in the space marked 3. You are to answer the 15 questions in the first column in the same way as you answered the second sample. For each question there are two choices. You are to decide which one has the correct capitalization and punctuation and mark the answer space numbered the same as the correct form. Are there any questions about what you are to do?** (Pause.)

"Begin with question 1 and answer as many questions as you can. When you finish the first column, go back and check your work but do not go on to the next column. READY. GO!" (Record the starting time on the board.)

After *4 minutes*, say: **"Now stop working on the first column and read the directions at the top of the next column. They say: 'Each exercise below has two numbered parts. One part is well written and makes good sense. The other is poorly written. Choose the good one and mark the answer space that has the same number as your choice.' Now look at the sample. It says: '1 We'll go when you are ready. 2 We'll go. When you are ready.' In which of these examples is there no incomplete sentence?** (Pause for reply.) **Yes, number 1, 'We'll go when you are ready,' is a complete sentence. In number 2 the second part, 'When you are ready,' is not a complete sentence. So you will fill in the space marked '1.' Now read each pair of examples below and decide which one of each pair of examples is written correctly. Mark the answer space at the right which has the same number as your choice. Are there any questions about what you are to do?** (Pause.)

"Begin with question 16 and answer as many questions as you can. When you finish question 27 at the end of this page, go back and check your work on this column. Do not turn to the next page. READY. GO!" (Record the starting time on the board.)

After an additional *4 minutes*, say: **"Now stop working on page 9 and turn to page 10."** (Make sure that the children do this.)

"Now look at the directions at the top of page 10. They say: 'In each sentence, decide which of the numbered words is correct. Then mark the answer space at the right which has the same number as the word you have chosen.' Now look at the sample. It says: 'Apples 1 is 2 are good.' Which is correct, 'is' or 'are'? (Pause for reply.) **Yes, 'are' is correct, and it is number 2. So the space marked 2 has been filled in.**

"Read each sentence and decide which of the numbered words is correct. Then mark the answer space at the right that has the same number as the word you have chosen.

"Now begin with question 28 and answer as many questions in both columns of this page as you can. When you finish this page, check your answers. Do not turn back to page 9 or forward to page 11. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After an additional *8 minutes* (16 in all), say: **"STOP! Put your pencil down."** Collect the test booklets immediately. (The second sitting should end here.)

SECOND SITTING (*Cont'd*) — TEST 4. *Language*

ADVANCED — GRADES 7, 8, AND 9

"Now turn to the next page (page 9), which is Test 4, Language. (Pause until all have found the place.) **Now fold the page back, like this, so that only page 9 is showing.** (Demonstrate and see that all do this correctly.) **Look at the top of the page, where it says 'DIRECTIONS.'** (Hold up a booklet and point to the proper place on the booklet.) **The directions tell you what to do. They say: 'In each pair of words in heavy type there is an error in either capitalization or punctuation. You are to decide which one of each pair has the correct capitalization and punctuation. Then mark the answer space at the right that has the same number as the correct form.' Look at the first sample. It says: 'This is 1 mr. Jones,' with the letter M in Mr. not capitalized, '2 Mr. Jones' with the letter M capitalized. The second form is right, since 'Mister' should have a capital M; so the answer space under number 2 has been filled in. Now look at the second sample. It says: 'St. Louis, Missouri.' 'St. Louis Missouri' is written twice, once with a comma after 'Louis' and once without a comma. Which is correct?** (Pause for reply.) **Yes, form 3 which has the comma is correct; so fill in the space marked 3. You are to answer the 17 questions in the first column in the same**

way you answered the second sample. For each question there are two choices. You are to decide which one has the correct capitalization and punctuation and mark the answer space numbered the same as the correct form.

"Begin with question 1 and answer as many questions as you can. When you finish the first column, go right on to the second column. Read each set of directions as you come to them and do the exercises under them. When you finish page 9, go right on to page 10. Do not stop until you finish page 10, or until time is called. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After *16 minutes*, say: **"STOP! Put your pencil down."** Collect the test booklets immediately. (The second sitting should end here.)

THIRD SITTING — TEST 5. *Arithmetic Reasoning*

When the third sitting begins, make sure that each pupil has his own booklet and a piece of scratch paper.

After the booklets have been distributed, say to the pupils: **"Now open your booklet to Test 5, Arithmetic Reasoning, which starts on page 11. Fold the page back, like this, so that only page 11 is showing.** (Demonstrate.)

"Look at the top of the page, where it says 'DIRECTIONS.' (Hold up a booklet and point to the proper place.) **The directions tell you what to do. They say: 'Work an example, and then compare your answer with the answers which follow it. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If you do not find the correct answer, mark the space under the letter for not given.' Now look at the samples.** (Hold up a booklet and point to the sample exercises.) **The first sample says: 'How many balls are 3 balls and 4 balls? 3 4 7 12 not given.' Which is the correct answer?** (Wait for the class to answer.) **Yes, the answer is '7.' The letter beside the '7' is 'c,' so the answer space under the letter 'c' has been filled in. Now study the second sample. What is the answer?** (Pause for reply.) **Yes, '5' is the correct answer to this problem, but it is not listed among the choices. Hence, the correct answer for this example is the answer 'not given'; so you will fill in the space under the letter 'j.'**

"For each example on this page and on the next page, decide which is the correct answer, and fill in the answer space below the letter which represents the answer you have chosen. Use the scratch paper I gave you to figure on.

"Begin with question 1 and answer as many questions as you can. When you finish pages 11 and 12, go right on to Part II, on page 13. When you finish page 13, go back and check your answers. READY. GO!" (Record the starting time on the board.)

After *25 minutes*, say: **"If you have not already started work on Part II, on page 13, do so now."** (Make sure that the pupils do this.) Then say: **"Go on working."**

After an additional *10 minutes* — i.e., at the end of *35 minutes* — say: **"STOP! Put your pencil down."**

Collect the test booklets immediately. (The third sitting ends here.)

FOURTH SITTING — TEST 6. *Arithmetic Computation*

When the fourth sitting begins, make sure that each pupil has his own booklet and a piece of scratch paper.

After the booklets have been distributed, say to the pupils: **"Now open your booklet to Test 6, Arithmetic Computation, which starts on page 14.** (See that all pupils have the correct page.) **Now fold the booklet back, like this, so that only page 14 is showing.** (See that all do this correctly.)

"Look at the top of the page, where it says 'DIRECTIONS.' (Hold up a booklet and point to the proper place.) **The directions tell you what to do. They say: 'Work each example. Then compare your answer with the answers given at the right of the example. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If the correct answer is not given, mark the answer space under the letter for not given. Look carefully at each example to see what it tells you to do. If you need to do any figuring, use a separate sheet of paper.' Now look at the two samples. The first sample has been marked correctly and you are to mark the second sample.** (Pause while the pupils do this.)

"Now begin with question 1 and answer as many questions on this page and the next two pages as you can. When you finish page 16, go back and check your work on this test. Do not work on any other test. Are there any questions about what you are to do? (Pause.) **READY. GO!"** (Record the starting time on the board.)

After *35 minutes*, say: **"STOP! Close your booklet and put your pencil down."** Collect the test booklets immediately. (The last sitting ends here.)

4 Directions for Scoring

The directions for scoring accompany the keys which contain the correct answers. These directions for scoring should be read carefully and followed implicitly, and the keys should be used for the greatest accuracy and ease of scoring.

The raw score for each test is the number of right answers, except for the Language Test, for which it is number right minus number wrong. The Language Test is scored in this way because it consists of two-choice items and, consequently, guessing or chance success may affect the scores on it to a greater extent than on the other tests. Use of number right minus number wrong as the score tends to counteract the effect of guessing. Because the test is scored in this way, negative scores will occasionally be found; these are to be treated as zero scores. Zero scores on any subtest are not assigned any grade equivalent or otherwise interpreted. They should be regarded as evidence only of the fact that a pupil attaining such a score in a particular test is not adequately measured by that test.

5 Interpretation of Scores; Norms

A raw score on *Stanford Achievement Test*, as on most tests, has but little meaning in itself. Raw scores acquire meaning when they are related to some set of *norms* — that is, the scores made by some specified group — and converted to some type of score intrinsically more meaningful. There are many groups of pupils whose scores might be used as bases for comparison or interpretation of raw scores — e.g., pupils of given grade, age, sex, mental ability, curriculum, type of school, etc., but, practically, it is not possible to provide all the kinds of normative data that might be useful.

Scores on *Stanford Achievement Test* are interpreted chiefly by reference to two sets of norms, as follows:

a. *Modal-age grade norms*, recommended for interpretation of individual scores.
b. *Total-group grade norms*, recommended for interpretation of group averages.

The nature of these two sets of norms and their special characteristics are outlined below. This discussion will be more meaningful if one understands the nature of grade and age norms. *Grade norms* permit comparison of a score with the scores made by pupils of specified grade status. They yield a *grade equivalent* for a given score, which indicates the grade placement of pupils for whom the given score is the average score. Similarly, *age norms* permit comparison of scores with the scores obtained by pupils of specified age, and yield *age equivalents*.

Modal-age grade norms. The 1940 edition of *Stanford Achievement Test* introduced a refinement in the derivation of grade norms, the so-called *modal-age-grade* concept. Grade norms embodying this concept, instead of being based on the scores of all pupils in a given grade, are based on the scores only of those pupils who are typical with respect to age. Thus, the norm group is specified with respect to both grade and age status. The most common single age group in a grade is designated the "modal-age" group, whence the name for these norms. Use of modal-age norms permits comparison of the typical pupil in a grade with pupils who are most nearly like him with respect to both grade and year of age. These children have been in each grade only one year and entered school at nearly the same age.

Approximately 65% of the pupils in any grade are in the modal-age group.[1] To compare these pupils with the total population in each grade would be to reduce the accuracy of the comparison to the extent that the norms for the modal-age group and the total group differ; these differences range from approximately one tenth of a year in the early grades to a half year, or more, in the higher grades. The difference is negligible at Grades 2 and 3, but of increasing magnitude in later grades. The average performance of the total-grade group is depressed by virtue of the fact that the total group includes both accelerated and retarded pupils, in addition to those normally placed for age, and because there are more retarded, duller pupils than there are accelerated, brighter pupils. Use of the total-group average as the norm for evaluation of an individual's performance, therefore, sets an unduly low standard for the majority of pupils and, in the long run, is likely to encourage acceptance of an unnecessarily low level of achievement.

[1] Exact per cent in each grade is given in Table 8.

The Profile Chart on the front of the test booklet is drawn in terms of modal-age grade norms. (This was also true of the Profile Chart of the 1940 edition.)

If results on *Stanford* expressed in terms of modal-age norms are to be compared with results on other achievement tests which are not expressed in terms of modal-age norms, it should be recognized that there are these systematic differences between modal-age grade and total-group grade norms. Appropriate adjustments should be made when different types of norms are involved.

Total-group grade norms. Total-group grade norms, in contrast to modal-age norms, are based on the performance of *all* the pupils in a given grade. The total-group norms should be used to interpret average scores of a total class, school, or school system because usually such a total includes both the approximate 65% of pupils who are at grade for age and the other 35% who are retarded or accelerated.

The total-group grade norms are given in Table 1. This table gives total-group grade equivalents corresponding to *grade scores* in the various subjects. A given score on any subtest nearly always has a higher grade equivalent according to total-group norms than it does according to modal-age norms.

Grade equivalents above 10.0. The method of derivation of grade equivalents is outlined in the section of this manual dealing with standardization of the test (page 18). The grade norms are based on the performance of pupils in Grades 1 through 9 tested in the standardization program. Therefore, grade equivalents up to 10.0 may be considered to reflect accurately the achievement in the various subjects of pupils of the designated grade status. Beyond 10.0, however, the grade equivalents assigned to scores were derived by a process of extrapolation and cannot be interpreted as signifying the performance typical of pupils of the indicated grade placement. These values are fictitious and provided merely for the convenience of having all interpretation of scores made in similar terms. For example, a score of 38 on the Advanced Paragraph Meaning Test has a grade equivalent of 11.1, but this must not be construed to mean that pupils in Grade 11.1 would have an average score of 38. The grade equivalents beyond 10.0 are, however, comparable from subtest to subtest in the sense that a given grade equivalent is always assigned to the score having a given percentile rank in the ninth-grade distribution.

TABLE 1. Total-Group Grade Equivalents Corresponding to Grade Scores

Grade Score	1 Par. Mean.	2 Word Mean.	3 Spell.	4 Lang.	5 Arith. Reas.	6 Arith. Comp.
128	12.9+	12.9+	12.9			12.8
127	12.9	12.9	12.8		12.9+	12.7
126	12.9	12.8	12.8		12.9	12.7
125	12.8	12.7	12.7		12.8	12.6
124	12.8	12.6	12.6		12.7	12.5
123	12.8	12.5	12.5		12.7	12.4
122	12.7	12.4	12.4		12.6	12.3
121	12.6	12.4	12.4	12.9+	12.5	12.2
120	12.5	12.3	12.3	12.9	12.4	12.1
119	12.4	12.2	12.2	12.7	12.3	12.0
118	12.3	12.1	12.1	12.5	12.2	11.9
117	12.1	12.0	12.0	12.3	12.1	11.8
116	12.0	11.9	11.9	12.1	12.0	11.7
115	11.9	11.8	11.8	11.9	11.9	11.6
114	11.8	11.7	11.7	11.8	11.8	11.5
113	11.7	11.6	11.7	11.7	11.7	11.4
112	11.6	11.6	11.6	11.6	11.6	11.3
111	11.5	11.5	11.5	11.5	11.5	11.2
110	11.4	11.4	11.4	11.5	11.4	11.2
109	11.2	11.3	11.3	11.4	11.3	11.1
108	11.1	11.2	11.2	11.3	11.2	11.0
107	11.0	11.1	11.1	11.2	11.1	10.9
106	10.9	11.0	11.0	11.1	11.0	10.8
105	10.8	10.9	11.0	11.0	10.9	10.7
104	10.7	10.8	10.9	10.9	10.8	10.6
103	10.6	10.7	10.8	10.8	10.7	10.5
102	10.5	10.6	10.7	10.7	10.6	10.4
101	10.4	10.6	10.6	10.6	10.5	10.3
100	10.3	10.5	10.5	10.5	10.4	10.2
99	10.2	10.4	10.4	10.4	10.3	10.1
98	10.1	10.3	10.3	10.3	10.2	10.0
97	10.1	10.2	10.2	10.2	10.1	9.9
96	10.0	10.1	10.1	10.1	10.0	9.9
95	9.9	10.0	10.0	10.1	10.0	9.8
94	9.8	9.9	9.9	10.0	9.9	9.7
93	9.8	9.8	9.8	9.9	9.8	9.6
92	9.7	9.7	9.7	9.8	9.7	9.5
91	9.6	9.6	9.6	9.7	9.6	9.4
90	9.5	9.5	9.6	9.6	9.4	9.4
89	9.4	9.4	9.5	9.5	9.3	9.3
88	9.3	9.3	9.4	9.4	9.2	9.2
87	9.2	9.2	9.3	9.3	9.1	9.1
86	9.1	9.1	9.1	9.1	9.0	9.0
85	9.0	9.0	9.0	9.0	8.9	8.9
84	8.9	8.9	8.9	8.9	8.8	8.7
83	8.8	8.9	8.8	8.8	8.7	8.6
82	8.7	8.8	8.7	8.7	8.6	8.5
81	8.6	8.7	8.6	8.7	8.5	8.4
80	8.5	8.6	8.4	8.6	8.4	8.3
79	8.4	8.4	8.3	8.5	8.3	8.2
78	8.3	8.3	8.1	8.4	8.2	8.1
77	8.2	8.2	8.0	8.2	8.1	8.0
76	8.1	8.1	7.9	8.1	8.0	7.9
75	8.0	8.0	7.8	8.0	7.9	7.8
74	7.9	7.9	7.7	7.9	7.8	7.7
73	7.8	7.8	7.6	7.8	7.7	7.6
72	7.7	7.7	7.5	7.7	7.5	7.5
71	7.6	7.6	7.4	7.6	7.4	7.3
70	7.5	7.5	7.3	7.5	7.3	7.2

Grade Score (*Cont'd*)	1 Par. Mean.	2 Word Mean.	3 Spell.	4 Lang.	5 Arith. Reas.	6 Arith. Comp.
69	7.4	7.4	7.2	7.4	7.2	7.1
68	7.3	7.3	7.1	7.3	7.1	7.0
67	7.2	7.1	7.0	7.2	7.0	6.9
66	7.1	7.0	6.9	7.1	6.9	6.8
65	7.0	6.9	6.8	7.0	6.8	6.7
64	6.8	6.8	6.7	6.8	6.7	6.6
63	6.7	6.7	6.6	6.7	6.6	6.5
62	6.6	6.6	6.5	6.6	6.5	6.4
61	6.5	6.5	6.4	6.5	6.4	6.3
60	6.3	6.4	6.3	6.4	6.3	6.1
59	6.2	6.3	6.2	6.3	6.2	6.0
58	6.1	6.2	6.1	6.2	6.1	5.9
57	6.0	6.1	6.0	6.1	5.9	5.8
56	5.9	6.0	5.9	6.0	5.8	5.7
55	5.8	5.9	5.8	5.9	5.7	5.6
54	5.7	5.7	5.7	5.8	5.6	5.5
53	5.6	5.6	5.6	5.7	5.5	5.4
52	5.5	5.5	5.5	5.6	5.4	5.3
51	5.4	5.4	5.4	5.5	5.3	5.2
50	5.2	5.3	5.3	5.4	5.2	5.1
49	5.1	5.2	5.2	5.3	5.1	5.0
48	5.0	5.1	5.1	5.2	5.0	4.9
47	4.9	5.0	5.0	5.1	4.9	4.8
46	4.8	4.9	4.9	5.0	4.8	4.7
45	4.7	4.8	4.8	4.9	4.7	4.6
44	4.6	4.7	4.7	4.8	4.6	4.5
43	4.5	4.6	4.6	4.7	4.5	4.4
42	4.4	4.5	4.5	4.6	4.4	4.3
41	4.3	4.4	4.4	4.5	4.3	4.2
40	4.2	4.2	4.3	4.4	4.2	4.1
39	4.1	4.1	4.2	4.3	4.1	4.0
38	4.0	4.0	4.0	4.2	4.0	3.9
37	3.9	3.9	3.9	4.1	3.9	3.8
36	3.8	3.8	3.8	4.0	3.7	3.7
35	3.7	3.7	3.7	3.9	3.6	3.6
34	3.6	3.6	3.6	3.8	3.5	3.5
33	3.5	3.5	3.5	3.7	3.4	3.3
32	3.4	3.4	3.4	3.6	3.3	3.2
31	3.3	3.3	3.3	3.5	3.2	3.1
30	3.2	3.2	3.2	3.3	3.1	2.9
29	3.1	3.1	3.1	3.2	2.9	2.8
28	3.0	2.9	3.0	3.1	2.8	2.7
27	2.9	2.8	2.9	3.0	2.7	2.6
26	2.8	2.7	2.8	2.9	2.6	2.5
25	2.7	2.6	2.7	2.9	2.5	2.5
24	2.5	2.5	2.6	2.8	2.4	2.4
23	2.3	2.4	2.5	2.7	2.3	2.3
22	2.2	2.3	2.4	2.6	2.2	2.2
21	2.1	2.2	2.3	2.5	2.1	2.1
20	2.0	2.1	2.2	2.3	2.0	2.0
19	1.9	2.0	2.1	2.2	1.9	1.9
18	1.8	1.9	2.0	2.1	1.8	1.8
17	1.7	1.7	1.8	2.0	1.7	1.7
16	1.6	1.6	1.7	1.9	1.6	1.6
15	1.5	1.5	1.6	1.8	1.5	1.5
14	1.3	1.4	1.4	1.7	1.4	1.4
13	1.2	1.2	1.3	1.6	1.3	1.3
12	1.1	1.1	1.2	1.5	1.2	1.2
11	1.0	1.0	1.1	1.4	1.1	1.1
10			1.0	1.3	1.0	1.0

Grade placement at time of testing. The grade placement for any testing date may be determined from Table 2, which gives the tenth of the school year corresponding to any date within the school year for pupils on an annual basis. If a school year is atypical, grade placement should be determined by computing the number of tenths of a school year which have elapsed at the time the tests are administered. Comparison of obtained grade equivalent with grade placement immediately reveals whether the pupil or group has attained in any subject a status superior, inferior, or about equal to that typical of other pupils of similar grade placement.

TABLE 2. Grade Placement at Time of Testing

Date of Testing	Sept. 1–Sept. 15	Sept. 16–Oct. 15	Oct. 16–Nov. 15	Nov. 16–Dec. 15	Dec. 16–Jan. 15	Jan. 16–Feb. 15	Feb. 16–Mar. 15	Mar. 16–Apr. 15	Apr. 16–May 15	May 16–June 15
Grade Placement	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9

Profile Chart. Interpretation of results on *Stanford Achievement Test* is facilitated by use of the Profile Chart that appears on the front page of each test booklet. A marked copy of the Chart is reproduced below as Figure 1. On this Profile Chart there is a scale for each test in the Partial battery, graduated in terms of grade score (or grade equivalent). Results on the several subtests are plotted on the Profile Chart by making a cross or large dot at the appropriate place on the respective scales. If these plotted points are connected, the resulting graph will permit ready identification of areas of strength and weakness, and the magnitude of the departure from typical performance in the various subjects. It is helpful to draw a line across the Profile Chart at a point corresponding to the grade placement at the time of testing, which line will serve as a kind of reference point for evaluating the status in each subject.

Slightly below the scale for each subtest there appears a short bar whose function is to indicate the magnitude of the *standard error of measurement* at one part of the scale, and thus to suggest the degree of confidence that may be reposed in the scores on the various tests. In every obtained test score there is a certain "error of measurement," by which is meant the difference between the score as obtained and the hypothetical "true" score or perfectly reliable measure. For any test the magnitude of such differences is indicated by the standard error of measurement of a score on the test. If one asserts that an individual's "true" score will fall in an interval extending one standard error of measurement on either side of his obtained score, such assertion will be correct, on the average, in two cases out of three. Inasmuch as these error bars are plotted in terms of grade equivalent, their magnitude reflects not only the relative reliability of the tests, but also the grade equivalent distance corresponding to a given increment in score for the different functions. Two tests may have the same reliability coefficients but different size error bars if their scores differ in variability, expressed either in terms of raw score or grade equivalent.

It is a common and useful practice to detach the cover page on which a profile has been plotted and to retain this Profile Chart in the pupil's cumulative record folder. Results of subsequent tests may be plotted on the same Chart, providing a graphic picture of change in achievement status in the several functions between successive testings. Repeated testing of this kind greatly enhances the value of any test results since it provides not only status measures but also measures of growth.

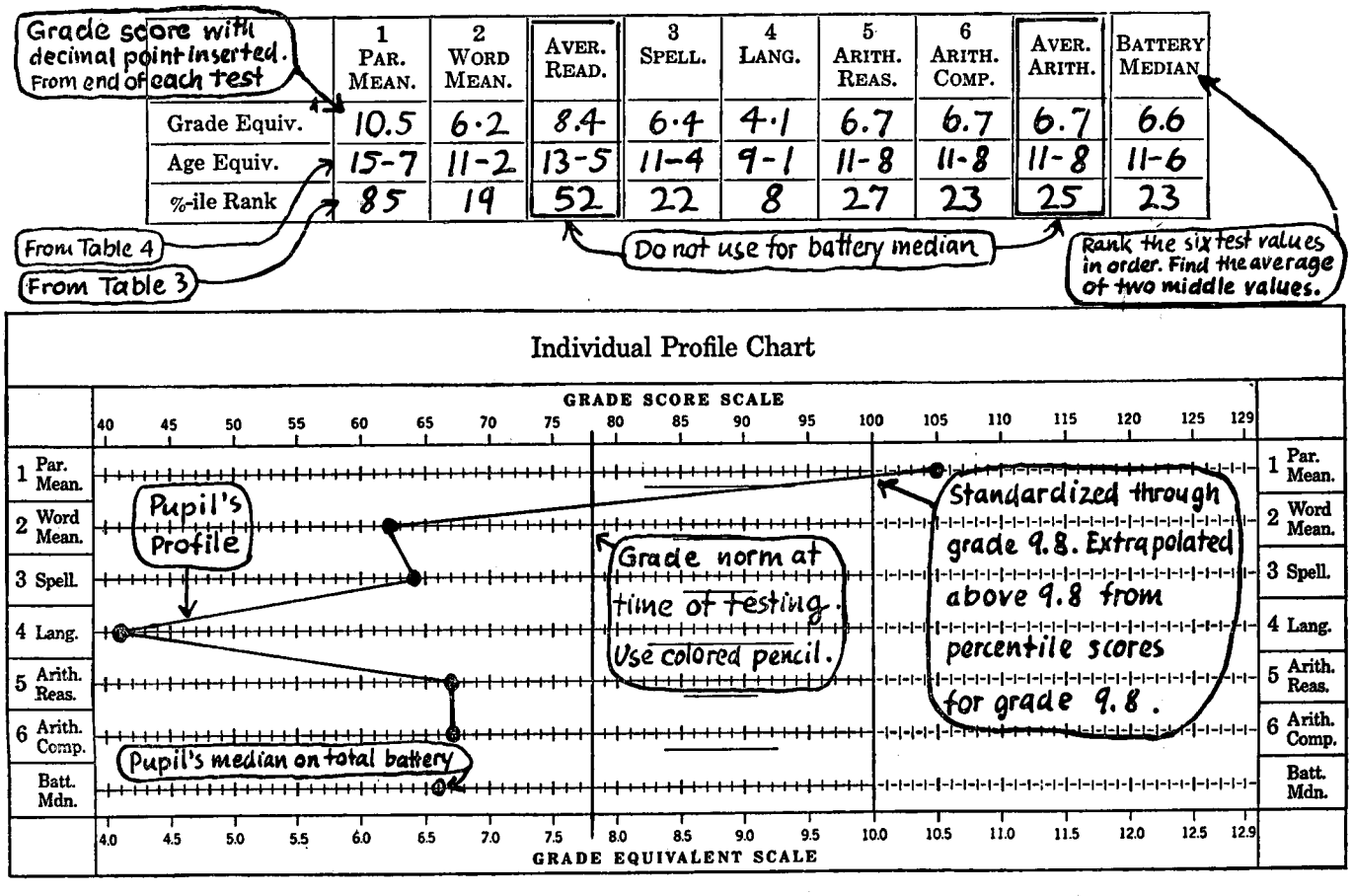


FIGURE 1. ILLUSTRATION OF COMPLETED PROFILE CHART FOR ADVANCED BATTERY

Percentile norms based on modal-age grade groups. For many purposes it is preferable to compare the scores of a pupil with the scores of other pupils of the same grade status rather than with those of pupils in other grades, which, in effect, is what a grade equivalent system of interpretation does. Accordingly, there are presented in Table 3 *percentile norms* for the subtests of the Intermediate and Advanced Partial Batteries. In this table the grade scores corresponding to selected percentiles for modal-age groups are given for several possible testing-dates — roughly for beginning-, middle-, and end-of-year testing. Percentiles for scores not included in the tables or percentiles for testing dates other than those included may be estimated by interpolation if such additional refinement is desired. The percentile rank corresponding to a grade score shows the percentage of pupils of the given grade placement having scores less than the given score. For example, a grade score of 105 on the Paragraph Meaning Test has a percentile rank of 95 at Grade 6.8, which means that 95% of the modal-age pupils of this grade status made grade scores less than 105. Use of percentile norms tends to avoid erroneous inferences as to the desirability of effecting changes in grade placement, such as are sometimes drawn when a pupil's grade equivalents differ greatly from his actual grade placement. Percentiles have the further advantage of being easy to explain to parents or other teachers. Although the advantages of percentile norms are most apparent in the upper grades, it is becoming increasingly common to utilize this system for interpretation of scores at all levels.

TABLE 3. Grade Scores Corresponding to Selected Percentiles for Modal-Age Groups — Intermediate Battery

%-ile	Grade 5.2						%-ile	Grade 5.5						%-ile	Grade 5.8					
	Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.
98	93	90	73	91	76	66	**98**	98	93	80	96	80	70	**98**	101	97	91	99	84	74
95	81	80	69	84	71	63	**95**	89	82	75	87	75	66	**95**	97	85	82	90	79	71
90	74	70	65	77	66	61	**90**	80	74	70	81	70	64	**90**	89	79	76	85	74	68
85	69	65	63	74	63	60	**85**	75	69	67	76	67	62	**85**	81	75	72	80	71	65
80	65	62	61	70	61	58	**80**	71	67	65	74	65	61	**80**	76	71	69	76	69	64
75	63	59	59	67	58	57	**75**	67	64	63	71	62	60	**75**	73	69	67	74	67	63
70	60	57	57	64	56	56	**70**	64	62	61	67	61	59	**70**	69	67	65	71	65	62
65	58	55	55	61	55	55	**65**	62	59	60	65	59	58	**65**	65	65	63	68	63	61
60	56	54	54	58	54	54	**60**	61	58	58	61	57	57	**60**	63	62	62	65	61	60
55	54	52	53	55	53	53	**55**	57	56	56	59	56	56	**55**	61	60	60	62	60	59
50	52	51	51	52	52	52	**50**	54	55	55	55	55	55	**50**	58	58	58	59	58	58
45	49	49	49	50	50	51	**45**	51	52	53	53	53	54	**45**	56	56	57	56	56	57
40	47	47	47	47	48	50	**40**	50	50	51	50	51	53	**40**	53	54	55	53	55	56
35	46	45	46	44	47	49	**35**	48	48	49	47	50	52	**35**	51	52	54	50	53	55
30	44	44	44	42	46	48	**30**	46	47	48	44	48	51	**30**	49	50	52	47	51	53
25	42	42	42	38	44	46	**25**	44	45	46	41	47	50	**25**	47	48	49	43	49	52
20	40	41	40	36	43	45	**20**	42	43	44	37	45	48	**20**	45	46	47	40	47	51
15	38	39	38	31	40	43	**15**	40	41	41	34	43	46	**15**	43	44	45	36	45	49
10	34	35	35	27	38	40	**10**	37	39	38	29	40	43	**10**	40	41	42	30	43	45
5	30	31	31	19	33	36	**5**	32	34	34	21	36	39	**5**	35	37	36	23	38	40
2	25	26	26	11	29	32	**2**	27	29	29	12	32	34	**2**	30	32	31	14	34	36

%-ile	Grade 6.2						%-ile	Grade 6.5						%-ile	Grade 6.8					
	Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.
98	105	100	95	103	88	78	**98**	107	103	99	107	94	83	**98**	108	108	103	112	99	90
95	99	90	85	94	83	74	**95**	101	93	90	99	87	79	**95**	105	98	96	104	93	86
90	91	81	79	87	78	72	**90**	94	85	83	90	82	76	**90**	97	90	89	96	88	83
85	85	77	76	84	75	69	**85**	89	81	80	86	79	74	**85**	93	85	84	90	83	80
80	80	74	73	79	72	68	**80**	84	77	77	83	76	72	**80**	88	81	81	85	81	78
75	76	71	70	76	70	67	**75**	80	75	74	79	74	71	**75**	85	78	79	84	78	76
70	73	69	68	74	68	66	**70**	77	72	72	76	72	70	**70**	81	76	76	80	76	74
65	69	68	66	71	67	65	**65**	73	70	70	74	70	69	**65**	77	74	74	76	74	73
60	66	66	65	69	65	64	**60**	70	68	68	72	68	67	**60**	75	72	72	75	72	71
55	64	64	63	66	64	63	**55**	67	67	66	70	66	66	**55**	72	70	69	73	70	70
50	62	62	62	62	62	62	**50**	65	65	65	65	65	65	**50**	69	68	68	69	68	68
45	59	59	60	60	59	61	**45**	63	62	63	63	63	63	**45**	66	66	66	66	66	67
40	57	57	58	56	57	60	**40**	60	60	61	60	61	62	**40**	64	64	64	64	65	66
35	54	55	56	53	56	58	**35**	58	58	60	57	59	61	**35**	61	62	62	61	63	64
30	51	53	55	50	54	57	**30**	55	56	58	53	57	60	**30**	59	59	61	56	60	63
25	49	51	53	46	52	55	**25**	52	54	55	49	55	59	**25**	56	57	59	52	58	61
20	47	48	50	43	50	53	**20**	50	51	53	45	52	57	**20**	52	54	55	48	56	60
15	45	46	47	38	47	52	**15**	47	48	49	41	50	55	**15**	49	51	52	43	53	57
10	42	43	44	33	45	49	**10**	43	45	45	35	47	52	**10**	46	47	47	37	49	55
5	37	39	38	25	40	44	**5**	39	41	40	26	43	47	**5**	41	42	42	29	45	50
2	32	34	33	16	36	38	**2**	33	35	34	18	38	40	**2**	35	37	35	19	39	43

TABLE 3 (*Cont'd*). Grade Scores Corresponding to Selected Percentiles for Modal-Age Groups — Advanced Battery

%-ile	Grade 7.2						%-ile	Grade 7.5						%-ile	Grade 7.8					
	Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.
98	113	111	109	114	106	98	98	116	115	113	117	111	105	98	119	119	118	119	116	111
95	108	103	100	110	99	92	95	111	108	105	112	104	99	95	114	113	110	115	109	107
90	102	96	93	104	93	87	90	106	100	98	109	98	92	90	108	104	102	111	103	100
85	97	89	87	97	89	84	85	101	95	92	103	94	88	85	105	101	97	108	99	94
80	93	85	84	89	85	81	80	97	90	88	96	89	85	80	101	96	93	103	94	89
75	88	83	81	86	81	79	75	93	87	85	90	86	83	75	97	93	88	99	90	86
70	84	80	79	83	79	78	70	89	84	82	86	83	81	70	93	88	85	91	87	85
65	81	77	77	80	77	76	65	85	82	80	84	80	79	65	90	85	83	87	84	83
60	77	75	76	77	75	75	60	82	79	78	80	78	78	60	86	83	81	84	82	81
55	74	73	74	75	73	73	55	78	77	76	78	77	76	55	82	80	79	81	80	79
50	72	72	72	72	71	72	50	75	75	75	75	75	75	50	79	78	78	78	78	78
45	69	70	69	70	69	70	45	72	73	73	73	72	73	45	75	75	76	75	75	76
40	66	68	68	67	67	69	40	69	71	70	70	70	71	40	72	73	73	73	73	74
35	63	65	65	65	65	67	35	66	69	68	67	68	69	35	69	71	70	70	71	72
30	61	63	63	61	63	66	30	63	67	66	64	66	68	30	66	69	69	67	69	70
25	58	60	61	56	61	64	25	60	63	63	60	63	66	25	63	66	66	64	66	68
20	55	57	58	51	59	62	20	57	59	61	55	61	64	20	59	63	63	59	64	66
15	52	54	55	46	56	59	15	54	57	57	50	59	62	15	56	59	60	53	61	64
10	48	50	50	40	52	55	10	50	53	53	43	55	58	10	52	56	56	46	58	61
5	42	43	44	31	46	51	5	44	46	46	33	49	53	5	46	50	49	34	52	56
2	36	38	38	30 –	41	45	2	38	41	41	30 –	43	47	2	40	44	43	30 –	46	49

%-ile	Grade 8.2						%-ile	Grade 8.5						%-ile	Grade 8.8					
	Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.
98	120	120	120	121	119	115	98	122	122	123	123	121	118	98	123	125	126	123	124	122
95	115	115	113	117	113	111	95	117	116	117	119	118	114	95	117	119	120	121	123	118
90	111	107	107	113	107	105	90	113	110	111	116	111	110	90	114	113	115	118	115	114
85	107	104	101	111	103	100	85	109	106	107	113	107	106	85	111	109	112	115	111	112
80	104	99	97	108	99	96	80	106	102	102	110	104	103	80	108	106	107	112	108	108
75	100	95	94	104	95	92	75	103	99	99	108	100	99	75	105	101	104	110	105	106
70	96	91	89	98	92	90	70	99	96	95	103	97	96	70	102	100	100	108	102	103
65	93	88	87	92	89	87	65	96	92	92	98	94	92	65	99	97	98	103	98	100
60	89	86	84	87	86	85	60	93	89	88	92	91	90	60	96	94	94	99	96	97
55	86	84	82	85	84	83	55	89	87	86	87	88	88	55	93	90	91	93	94	93
50	82	82	81	82	82	81	50	85	85	84	85	85	85	50	88	88	88	88	89	89
45	78	79	78	78	79	79	45	82	83	82	81	83	83	45	85	86	86	85	87	88
40	75	77	76	75	77	78	40	78	80	79	79	81	81	40	82	84	83	82	85	85
35	72	75	74	73	75	76	35	75	77	77	75	78	79	35	78	81	80	79	82	83
30	69	72	72	70	72	73	30	72	74	75	73	76	77	30	75	77	78	75	79	80
25	65	69	69	67	70	71	25	68	72	73	70	73	75	25	71	75	76	73	77	78
20	62	66	67	63	67	69	20	65	69	69	66	70	72	20	68	72	73	69	73	75
15	58	63	63	58	64	67	15	61	66	66	62	67	69	15	64	69	69	65	70	72
10	55	58	59	50	60	63	10	57	61	62	54	62	66	10	59	64	65	58	65	69
5	49	52	52	39	54	59	5	51	55	56	43	57	61	5	54	57	59	48	60	63
2	43	46	46	30 –	48	52	2	44	48	48	30 –	51	55	2	47	50	50	34	53	57

%-ile	Grade 9.2						%-ile	Grade 9.5						%-ile	Grade 9.8					
	Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.		Par. Mean.	Word Mean.	Spell.	Lang.	Arith. Reas.	Arith. Comp.
98	125	125	126	124	126	123	98	126	126	127	124	127	125	98	127	127	127	125	127	127
95	120	119	122	122	121	120	95	121	122	124	123	122	122	95	123	123	124	123	123	123
90	116	116	117	119	117	116	90	118	119	119	119	119	119	90	120	120	120	120	120	120
85	113	112	113	116	113	114	85	115	115	115	117	115	116	85	119	117	117	118	117	118
80	110	108	110	113	110	111	80	112	111	112	114	112	113	80	114	113	114	115	113	115
75	107	105	107	109	107	107	75	109	108	109	110	109	110	75	111	110	110	110	110	111
70	105	102	102	108	105	105	70	107	106	105	109	107	107	70	109	109	107	109	108	110
65	102	100	100	106	102	102	65	105	103	102	107	104	105	65	107	106	105	107	106	106
60	99	97	97	102	99	99	60	102	100	99	103	101	102	60	105	103	101	104	103	104
55	96	94	93	97	95	96	55	99	98	96	101	98	99	55	101	101	99	102	101	101
50	93	92	91	92	92	92	50	95	95	94	96	95	95	50	98	98	97	99	98	98
45	89	89	88	87	90	90	45	92	92	89	92	92	91	45	96	95	94	96	95	94
40	85	86	85	85	87	87	40	89	89	87	87	89	88	40	93	92	89	92	91	90
35	82	84	82	81	84	84	35	85	87	84	84	86	86	35	89	90	86	87	88	87
30	78	81	79	78	81	81	30	81	84	81	81	83	83	30	84	87	83	84	85	85
25	74	78	77	75	78	79	25	76	81	79	77	80	80	25	80	84	80	80	82	81
20	70	75	74	72	75	77	20	73	78	76	74	77	78	20	75	81	77	76	79	79
15	66	72	70	67	72	73	15	68	74	72	69	74	74	15	70	77	74	72	76	76
10	61	67	67	61	67	69	10	63	70	68	64	69	70	10	64	73	69	66	71	71
5	55	60	60	50	61	64	5	56	63	61	52	63	65	5	57	67	62	55	65	66
2	48	53	51	37	55	58	2	50	56	52	40	58	59	2	51	58	53	43	60	60

TABLE 4. Modal Age Corresponding to Grade
(Age-Grade Couplets)

Grade	Age	Grade	Age	Grade	Age
11.0	16–1	7.5	12–6	4.0	9–0
10.9	16–0	7.4	12–4	3.9	8–11
10.8	15–10	7.3	12–3	3.8	8–10
10.7	15–9	7.2	12–2	3.7	8–9
10.6	15–8	7.1	12–1	3.6	8–8
10.5	15–7	7.0	12–0	3.5	8–6
10.4	15–5	6.9	11–10	3.4	8–5
10.3	15–4	6.8	11–9	3.3	8–4
10.2	15–3	6.7	11–8	3.2	8–3
10.1	15–2	6.6	11–7	3.1	8–1
10.0	15–1	6.5	11–6	3.0	8–0
9.9	14–11	6.4	11–4	2.9	7–11
9.8	14–10	6.3	11–3	2.8	7–10
9.7	14–9	6.2	11–2	2.7	7–9
9.6	14–8	6.1	11–1	2.6	7–8
9.5	14–7	6.0	11–0	2.5	7–7
9.4	14–5	5.9	10–11	2.4	7–5
9.3	14–4	5.8	10–10	2.3	7–4
9.2	14–3	5.7	10–8	2.2	7–3
9.1	14–1	5.6	10–7	2.1	7–2
9.0	14–0	5.5	10–6	2.0	7–1
8.9	13–11	5.4	10–5	1.9	6–11
8.8	13–10	5.3	10–4	1.8	6–10
8.7	13–9	5.2	10–2	1.7	6–9
8.6	13–7	5.1	10–1	1.6	6–8
8.5	13–6	5.0	10–0	1.5	6–7
8.4	13–5	4.9	9–11	1.4	6–5
8.3	13–4	4.8	9–10	1.3	6–4
8.2	13–2	4.7	9–9	1.2	6–3
8.1	13–1	4.6	9–7	1.1	6–2
8.0	13–0	4.5	9–6		
7.9	12–11	4.4	9–5		
7.8	12–9	4.3	9–4		
7.7	12–8	4.2	9–3		
7.6	12–7	4.1	9–1		

Age norms. Age norms, like grade norms, have been developed for modal-age groups and for total-age populations. The former permit comparison of scores with the scores made by pupils of a given age *who are also in a particular grade;* the latter, the more customary type of age equivalent, permit comparison of scores with the scores made by all pupils of a given age regardless of grade.

The age equivalent of a score in the modal-age norm system is the age associated with the modal-age grade equivalent for that score, shown in Table 4. Tables of age equivalents based on *total-age* populations are not included here because of lack of space but are available separately on request to World Book Company.

Battery median. If it is desired to obtain an average grade or age equivalent, or percentile, for all the tests in the battery for a pupil, class, or school, this may be done by finding the median of the six subtest values for the pupil or group. To find the median, rank the six subtest values in order of magnitude; the average of the third and fourth values thus arranged is the median.

Class Record and Class Analysis Chart. A Class Record and Class Analysis Chart is provided with each package of tests. It permits a convenient tabulation of the scores for a complete class and facilitates summarization of the scores. It may be filed as a permanent record. The Class Record is a self-contained unit; complete directions for its use will be found on the first page.

Reliability. Adequate interpretation of scores calls for knowledge of their reliability. Reliability data for the tests in the Intermediate and Advanced Partial Batteries are given in Tables 5a and 5b. These tables present split-half reliability coefficients for each subject in the two batteries, separately for pupils in Grades 5 through 9, based on random samples of pupils from 34 school systems in the standardization population.

TABLE 5a. Reliability Coefficients [1] and Related Data for Intermediate Battery Subtests

Test	N	r^2_{11}	Mean	Stand. Dev.[3]	S. E. Meas.
Grade 5					
Par. Mean.	243	.886	29.79	9.05	3.06
Word Mean.	243	.915	30.19	10.08	2.94
Spelling	243	.926	42.72	12.46	3.39
Language	243	.795	37.22	14.03	6.36
Arith. Reas.	243	.908	28.52	8.37	2.54
Arith. Comp.	243	.851	25.01	6.89	2.66
Grade 6					
Par. Mean.	248	.920	33.21	8.88	2.51
Word Mean.	248	.917	34.32	9.22	2.66
Spelling	248	.933	50.02	12.34	3.20
Language	248	.818	41.54	14.01	5.98
Arith. Reas.	248	.899	32.50	7.86	2.50
Arith. Comp.	248	.893	32.22	7.71	2.52

TABLE 5b. Reliability Coefficients [1] and Related Data for Advanced Battery Subtests

Test	N	r^2_{11}	Mean	Stand. Dev.[3]	S. E. Meas.
Grade 7					
Par. Mean.	262	.841	28.22	7.45	2.97
Word Mean.	262	.907	27.02	8.92	2.72
Spelling	262	.941	42.72	14.35	3.49
Language	262	.820	31.28	16.49	7.00
Arith. Reas.	262	.897	26.62	8.43	2.71
Arith. Comp.	262	.890	26.17	7.72	2.56
Grade 8					
Par. Mean.	254	.855	30.46	7.22	2.75
Word Mean.	254	.880	29.99	8.66	3.00
Spelling	254	.937	48.32	13.41	3.37
Language	254	.852	36.85	16.50	6.35
Arith. Reas.	254	.914	30.67	8.31	2.44
Arith. Comp.	254	.860	30.27	7.37	2.76
Grade 9					
Par. Mean.	298	.821	32.63	6.81	2.88
Word Mean.	298	.894	34.10	8.04	2.62
Spelling	298	.943	52.54	12.87	3.07
Language	298	.848	42.78	15.49	6.04
Arith. Reas.	298	.896	33.65	7.69	2.48
Arith. Comp.	298	.878	33.41	7.20	2.51

[1] Split-half reliability coefficients corrected by the usual Spearman-Brown formula.

[2] All tests are time-limit tests, but the time limits are sufficiently generous to permit almost all pupils to attempt all items. It is not believed that the speed factor causes these split-half coefficients to be spuriously high.

[3] Pupils in a single class, school, or even school system would probably exhibit somewhat less variability in the various tests than these samples of pupils from numerous systems, and hence might yield reliability coefficients slightly lower than those here reported.

Summary of types of norms. As indicated in the first paragraph in this section, many groups might be used as norm populations. It is recommended (1) that the modal-age grade norms be used for interpreting scores of individual pupils because they reflect the achievement of the pupil who is typical with respect to both age and grade; and (2) that the total-group grade norms in Table 1 be used for interpreting class, grade, and school averages because an

Converting Scores

(The following summary of rules for conversion and interpretation of scores is intended for quick reference. The user should read carefully the entire section on interpretation before applying these rules.)

The first step in the interpretation of any raw score is conversion to *grade score.* All subsequent steps use *grade score* and no further use is made of the raw score.

Grade scores. Find the number right (or right minus wrong for Language) in the table at the end of each subtest. The corresponding *grade score* appears directly beneath this number right.

Modal-age grade equivalents. The modal-age grade equivalent is the grade score with a decimal point inserted before the last digit.

Total-group grade equivalents. Locate the *grade score* in the left-hand column of Table 1, and read the total-group grade equivalent in the appropriate column for the particular subtest.

Percentiles. Locate in Table 3 the section appropriate for the time at which the tests were given — e.g., 6.5, 6.8, etc. Locate the *grade score* (or nearest grade score; see p. 12) in the appropriate subtest column, and read the percentile opposite it.

Age equivalents. To convert scores to age equivalents *based on total age populations,* use the table of total-group age equivalents (not included in these Directions but available on request to the publisher). *In the modal-age norm system* the age equivalent of a score is the age associated with the modal-age grade equivalent for that score, as given in Table 4.

Battery median. To find the median age or grade equivalent or percentile, rank the six subtest values in order of magnitude. The average of the third and fourth value is the median for the battery.

Example: A pupil tested at 6.8 makes a Paragraph Meaning score of 33 on Form J. His *grade score* is 64. (Bottom of p. 4 of test.) The modal-age grade equivalent is 6.4. The total-group grade equivalent is 6.8. (See Table 1.) He is at the 40th percentile of sixth-grade pupils at the end of the year. (See Table 3.)

entire class will be more like the total group in a grade than it will be like the modal-age group in the grade.[1]

[1] *Modal-age group within a class or school.* It is possible to make a more refined comparison of groups with national norms by comparing those pupils in a given class or system who correspond in age to the national modal-age group for their particular grade placement with the modal-age norms. The steps are as follows:

1. Arrange the test booklets, or Profile Charts, of the group in order of chronological age (preferably with the youngest pupil's paper on top).
2. List the names of pupils on the Class Record in order of age from youngest to oldest and record the test results.
3. Determine the grade placement as of the date of testing from Table 2 on page 10 as 6.7, 8.9, etc. In Table 4, find the age associated with this grade. Determine age values five months above and six months below. This 12-month spread of ages defines the modal-age group.
4. Draw horizontal lines across the Class Record to segregate the results of the pupils falling within this modal-age group.
5. Use a colored pencil to record the scores of these modal-age pupils on the Class Analysis Chart. Then compute the medians for the pupils whose values are thus recorded. When you compare these medians with the national modal-age norms on the Profile Chart, you will be comparing groups of pupils of like age and like schooling, separated from accelerated and retarded pupils.

6 Practical Suggestions for Use of Results

This section may well be prefaced by a few general principles concerning the use of achievement test results.

1. Teacher participation in the planning of a testing program serves to alert the teacher more fully to the possibilities of using test results for the improvement of instruction and for individual guidance.
2. Results of the same achievement tests may be used for a variety of purposes — administrative, supervisory, instructional, and guidance.
3. Standardized testing is essentially a method of fact-finding. The facts revealed rarely *in themselves* indicate any appropriate action. They must constantly be related to other elements in the situation, such as the philosophy of the school system, administrative considerations, and pupil abilities.
4. A test should be selected primarily to do what it does best.

Function of this test. Stanford Achievement Test is a general achievement test, so constructed as to be sharply analytical among subjects. Six separate tests, each of satisfactory reliability, are available to analyze group or class differences among subjects, and also differences in the abilities of an individual pupil. *Stanford* is constructed on the premise that the most generally useful achievement test for all pupils, and hence the first to be used in a testing program, should be a measure of their general mastery of the various school subjects. Diagnosis when needed can be accomplished only through tests long enough to yield subskill measures of adequate reliability, which measures must ordinarily be supplemented by direct teacher observation. The role of *Stanford* in this connection is the dependable identification of those pupils whose ability is so deficient in any given area as to point to the need for the intensive testing and observation that may properly be called diagnostic.

The authors do not claim that the test measures all the desirable aspects of pupil growth, as in attitudes, or in group behavior. They point out, however, that the measures it does yield are reliable data about generally accepted objectives of education, which data can be put to excellent use in improvement of instruction and in the adjustment of individual pupils. Inability to measure all of the outcomes of education should not deter one from measuring those functions for which there are suitable measures.

The paragraphs which follow offer general suggestions for use of the test results. They do not attempt to specify instructional, remedial, or other action to be taken, for such judgments must be made on the basis of the general professional equipment of the teacher, supervisor, or administrator, and in the light of local conditions. Teachers are urged to seek further suggestions in the extensive literature on diagnosis and remedial instruction.

USING RESULTS FOR INDIVIDUAL APPRAISAL AND GUIDANCE

Stanford Achievement Test provides quickly attained, precise measures of the level of achievement in several subjects of each pupil in a class, which, by means other than testing, would require several weeks even to approximate. A knowledge of *Stanford Achievement Test* scores affords a basis for individualization of instruction early in the school term. As mentioned above, not all aspects of pupil growth are measured, but the more assistance a teacher has in obtaining dependable information on a few important aspects, the more time she will have to devote to study of other aspects by other means. Furthermore, level of success in reading or arithmetic is often related to some of these other aspects as it affects a pupil's adjustment or contributes to his behavior problems.

A reliable record of pupil growth begun in the primary grades is of assistance in later grades and in the junior high school for purposes of adjustment and guidance.

One function of *Stanford Achievement Test* that should not be overlooked is the identification of the high achievers. Identification of the superior and the gifted in the lower grades permits the provision for them of an enrichment program that is stimulating and challenging.

USING RESULTS FOR ANALYSIS OF CLASS PERFORMANCE

The teacher needs to know the achievement status of her class as a whole. She will profit by knowing its deficiencies as she plans her instruction. The Class Analysis Chart, a copy of which is furnished in each package of tests, permits a convenient, easily interpreted summary of the strengths and weaknesses of an entire class just as the Profile Chart does for an individual. *The teacher should keep in mind that class averages are to be compared with the total-group grade norms given in Table 1,* while individuals should be compared with the modal-age grade norms given on the Chart.

USING RESULTS IN ADMINISTRATION AND SUPERVISION

Stanford Achievement Test is widely used by administrators and supervisors as a periodic measure of status. Objective measures in the areas covered by the subtests provide data which describe a very significant portion of school achievement. To have this much definite knowledge about pupils puts one in a more favorable position to consider their total learning and adjustment.

The most common use made of the test results for a school system is the comparison of the average, or median, score in each subtest with the national total-group norms in Table 1. A better interpretation of the achievement of a group can be made if one also knows the first and third quartile points. This amounts to knowing the median achievement of the poorer half and of the better half of the class.

In some instances state and local groups choose to develop group norms to apply in special situations, such as may involve language handicaps, a widely divergent curriculum, or an unusual selection of pupils. Such norms, in addition to the national norms, provide further useful information about the performance of pupils.

Norms should never be regarded as standards of excellence. One half of the pupils, on a national basis, will not achieve up to them, and the other half should not be contented with merely average achievement. Norms are guideposts. Degrees of departure from them are worth-while information on status. The degree must be judged desirable or undesirable in view of the goals set by the local curriculum for pupils of varying abilities.

7 K-Scores

For purposes of measurement of growth, grade or age equivalents have a limitation that is often not recognized — namely, they do not constitute scales of equal units. It is clear that a gain of one year of grade or age equivalent at one part of the scale does not represent the same amount of growth in ability as does gain of a year at another point of the scale. For example, there is extremely little growth in language skill between the eighth and the ninth grades, as compared to the gain between, let us say, the fourth and the fifth grades; but in the grade-equivalent system both of these amounts of growth are expressed as one year. The units in a percentile system similarly suffer from a lack of equality. While, for many purposes, this lack of equality of units is not a serious deficiency, it is necessary for accurate measurement of growth to have scales of equal units or, as they are known, *interval scales.*[1] To meet the need for such scales, there have been developed for each of the tests of *Stanford Achievement Test* so-called *K-scales,* which have units that are approximately equal throughout the entire range and which, therefore, are better adapted to reveal

[1] A discussion of the importance of equality of units, and of various methods of developing interval scales, is given in "Has He Grown?" by David V. Tiedeman, Test Service Notebook No. 12, available gratis from World Book Company.

TABLE 6. K-Scores Corresponding to Grade Scores

Grade Score	1 Par. Mean.	2 Word Mean.	3 Spell.	4 Lang.	5 Arith. Reas.	6 Arith. Comp.	Grade Score (*Cont'd*)	1 Par. Mean.	2 Word Mean.	3 Spell.	4 Lang.	5 Arith. Reas.	6 Arith. Comp.
129	149.0	130.2	107.5	102.6	124.9	140.6	**69**	86.4	80.5	94.9	98.1	80.1	62.2
128	143.5	129.0	107.4	102.6	124.1	139.7	**68**	86.0	80.0	94.5	97.9	79.4	60.7
127	138.7	127.9	107.3	102.6	123.3	138.8	**67**	85.6	79.6	94.1	97.7	78.7	59.2
126	136.3	126.8	107.1	102.6	122.5	137.8	**66**	85.2	79.1	93.7	97.5	78.2	57.7
125	134.0	125.7	106.9	102.6	121.6	136.9	**65**	84.6	78.6	93.3	97.3	77.6	56.4
124	131.7	124.7	106.8	102.5	120.8	135.8	**64**	84.2	78.2	92.8	97.0	77.0	55.2
123	129.7	123.7	106.6	102.5	120.0	134.9	**63**	83.7	77.7	92.4	96.7	76.5	53.9
122	127.2	122.8	106.5	102.5	119.2	133.7	**62**	83.3	77.3	91.9	96.5	75.8	52.7
121	125.3	121.7	106.4	102.5	118.5	132.6	**61**	82.9	76.9	91.4	96.3	75.3	51.5
120	123.0	120.7	106.3	102.5	117.6	131.4	**60**	82.4	76.5	90.9	96.0	74.7	50.3
119	121.1	119.6	106.1	102.5	116.8	130.1	**59**	82.0	76.1	90.5	95.7	74.1	49.1
118	119.2	118.6	105.9	102.4	116.0	128.8	**58**	81.5	75.7	90.0	95.4	73.5	47.9
117	117.4	117.5	105.8	102.4	115.3	127.7	**57**	81.0	75.4	89.5	95.1	73.0	47.0
116	115.8	116.4	105.6	102.4	114.6	126.2	**56**	80.6	74.9	89.0	94.9	72.6	46.3
115	114.1	115.3	105.5	102.4	113.7	124.9	**55**	80.3	74.5	88.5	94.6	72.0	45.5
114	112.8	114.2	105.4	102.4	112.8	123.4	**54**	79.9	74.1	87.9	94.3	71.5	44.7
113	111.4	113.2	105.2	102.3	111.9	121.6	**53**	79.6	73.7	87.5	94.0	71.0	43.8
112	110.4	112.3	105.0	102.3	111.1	120.1	**52**	79.2	73.3	86.9	93.7	70.5	43.2
111	109.5	111.2	104.9	102.3	110.4	118.8	**51**	78.7	73.0	86.5	93.4	70.0	42.6
110	108.4	110.1	104.7	102.3	109.5	117.4	**50**	78.4	72.6	85.9	93.1	69.5	41.9
109	107.4	109.0	104.6	102.2	108.6	115.9	**49**	78.0	72.2	85.4	92.7	68.9	41.2
108	106.4	108.1	104.4	102.2	107.8	114.6	**48**	77.6	71.8	84.9	92.5	68.3	40.6
107	105.4	107.1	104.2	102.2	107.0	113.1	**47**	77.3	71.5	84.5	92.1	67.6	40.0
106	104.7	106.3	104.0	102.1	106.2	111.6	**46**	76.9	71.1	83.8	91.7	67.0	39.6
105	103.9	105.4	103.9	102.1	105.5	110.0	**45**	76.6	70.7	83.2	91.4	66.5	39.2
104	103.1	104.4	103.8	102.1	104.7	108.5	**44**	76.2	70.3	82.7	90.9	65.9	38.7
103	102.5	103.6	103.6	102.0	103.9	107.1	**43**	75.8	69.9	82.1	90.6	65.4	38.3
102	101.8	102.7	103.4	102.0	103.0	105.9	**42**	75.5	69.6	81.6	90.1	64.8	37.8
101	101.2	101.9	103.3	101.9	102.2	104.7	**41**	75.2	69.3	81.0	89.7	64.3	37.4
100	100.6	101.1	103.1	101.9	101.3	103.4	**40**	74.8	68.8	80.4	89.2	63.6	37.0
99	100.0	100.3	102.9	101.8	100.5	102.0	**39**	74.5	68.5	79.8	88.7	63.1	36.7
98	99.6	99.6	102.7	101.8	99.9	100.8	**38**	74.1	68.1	79.2	88.3	62.5	36.2
97	99.1	98.8	102.5	101.7	99.3	99.7	**37**	73.7	67.7	78.5	87.8	62.0	35.8
96	98.5	98.0	102.4	101.7	98.7	98.7	**36**	73.5	67.4	78.0	87.4	61.5	35.4
95	98.1	97.3	102.2	101.6	98.0	97.4	**35**	73.2	67.1	77.5	86.9	61.0	35.0
94	97.7	96.5	102.0	101.6	97.5	96.3	**34**	72.8	66.7	76.7	86.4	60.5	34.6
93	97.3	95.8	101.8	101.5	96.9	95.0	**33**	72.5	66.4	76.0	85.9	59.9	34.3
92	96.8	95.1	101.7	101.5	96.3	93.9	**32**	72.2	66.0	75.3	85.4	59.4	33.8
91	96.4	94.5	101.6	101.4	95.7	92.8	**31**	71.9	65.7	74.7	85.0	58.8	33.5
90	95.8	93.7	101.4	101.4	95.1	91.6	**30**	71.6	65.4	73.9	84.5	58.3	33.2
89	95.4	92.9	101.2	101.3	94.6	90.2	**29**	71.3	65.0	73.3	84.0	57.7	33.0
88	95.0	92.3	101.0	101.2	94.0	89.0	**28**	71.0	64.7	72.5	83.5	57.1	32.8
87	94.6	91.6	100.7	101.1	93.4	87.7	**27**	70.7	64.4	71.7	83.0	56.6	32.7
86	94.2	90.8	100.4	101.0	92.7	86.3	**26**	70.5	64.1	71.0	82.5	56.2	32.6
85	93.8	90.2	100.2	100.9	92.0	85.0	**25**	70.3	63.7	70.3	82.0	55.6	32.5
84	93.3	89.5	99.9	100.8	91.2	83.5	**24**	70.0	63.4	69.4	81.6	55.2	32.4
83	92.7	88.7	99.7	100.6	90.5	82.0	**23**	69.7	63.1	68.7	81.0	54.7	32.3
82	92.3	88.1	99.4	100.5	89.7	80.8	**22**	69.5	62.8	67.8	80.5	54.1	32.2
81	91.8	87.5	99.0	100.4	88.9	79.4	**21**	69.4	62.5	67.0	80.0	53.6	32.1
80	91.4	86.8	98.7	100.3	88.2	78.1	**20**	69.1	62.1	66.1	79.5	53.0	32.0
79	91.0	86.2	98.4	100.1	87.6	76.8	**19**	68.8	61.8	65.2	78.9	52.4	31.9
78	90.6	85.5	98.0	99.9	86.7	75.4	**18**	68.7	61.6	64.4	78.3	51.9	31.9
77	90.0	84.9	97.7	99.7	85.7	74.0	**17**	68.4	61.4	63.6	77.8	51.5	31.8
76	89.6	84.3	97.3	99.6	85.0	72.6	**16**	68.2	61.0	62.7	77.2	50.9	31.7
75	89.1	83.7	97.0	99.4	84.3	71.2	**15**	68.0	60.7	61.8	76.7	50.4	31.7
74	88.7	83.1	96.7	99.2	83.6	69.7	**14**	67.7	60.3	61.0	76.1	49.8	31.6
73	88.3	82.6	96.4	98.9	82.7	68.1	**13**	67.6	60.0	60.3	75.5	49.3	31.6
72	87.8	82.0	96.0	98.7	82.1	66.7	**12**	67.4	59.8	59.6	74.9	48.6	31.5
71	87.4	81.5	95.6	98.5	81.4	65.3	**11**	67.2	59.6	58.7	74.4	48.0	31.5
70	86.8	81.0	95.3	98.3	80.7	63.8	**10**	67.0	59.4	57.9	73.8	47.3	31.5

true growth patterns in the several functions. These K-scales are such that for all functions the average performance of pupils of Grade 10.0 has a value of 100 and the unit of measurement is equal to one seventh the standard deviation of the scores of fifth-grade pupils.[1] Table 6 gives the K-scores corresponding to grade scores for all subtests in the Partial batteries. It is not necessary, in the ordinary interpretation of *Stanford* scores, to express scores in terms of K-scores, but the research worker concerned with study of relative rates of growth in the various functions, true changes in variability in the functions over the range of elementary grades, and related problems, will find the K-scores better suited for such purposes than raw scores or grade scores.

[1] The theory underlying K-scores and the procedures involved in their derivation are fully described in "The Determination of Units of Measurement Which Are Consistent with Inter- and Intra-Grade Differences in Ability" by Eric F. Gardner; unpublished Ed.D. dissertation, Harvard University School of Education, 1947.

8 Standardization and Construction

The usefulness of the *Stanford Achievement Test* norms depends largely on the nature of the group from which they were derived and upon the extent to which this group may be considered representative of a larger reference population. The intent has been to provide normative data descriptive of current achievement in the nation's schools, and it is believed that the *Stanford* norm data do approximate this goal very satisfactorily, though it is impossible to demonstrate that any norm sample is completely representative of the national school population. The paragraphs which follow describe the sample of pupils on which the norms are based, and the program conducted for the purpose of obtaining these norm data.

The standardization program. The first step in the standardization program was the establishment of specifications for the norm group with respect to such characteristics as geographic distribution, types of school systems to be included, numbers of pupils desired per grade, and extent of participation within coöperating systems. The distribution according to region and size of system was established in such a way that the norm sample would duplicate these characteristics for pupils in average daily attendance in public schools throughout the country (exclusive of pupils in segregated Negro systems). It was further decided that in all participating systems *every* pupil in at least three consecutive grades would be included in the standardization program so that there would be no question of selection within systems.

The desired representation in terms of number and kinds of systems was worked out on a state-by-state basis and invitations were extended to school systems in the various states meeting the desired specifications. A total of 363 school systems [1] drawn from 38 states agreed to participate; over 460,000 pupils were tested as part of this program. All participating school systems administered Form J of *Stanford Achievement Test* to all [2] the pupils in at least three consecutive grades between 15 April and 15 May 1952. In practically all cases tests were administered by the regular classroom teacher, utilizing virtually the same directions as are included in this manual. All tests were scored locally, though the scoring was subsequently checked, as indicated below.

The norm sample. Each participating system returned to the publisher's Division of Test Research and Service the test booklets of random samples of approximately 25 per cent of the pupils in each class, and, for all pupils tested, test booklet cover pages, showing all subtest scores. The samples of test booklets were selected in accordance with specific instructions calculated to insure that they would, in fact, be random samples of all pupils tested. A few school systems were excluded from the final norm group either because their results were received too late for inclusion, or because of administrative peculiarities such as semiannual promotion, etc. The final norm group thus included 340 of the total of 363 systems reported above, all of them being public school systems having annual promotion. The geographic distribution and the distribution according to size of the systems comprising the norm group are reported in Table 7.

The actual computation of norms was based on the results of the random samples of pupils from each system finally included, which collectively comprise the *norm sample.* The total number of pupils tested, the number and per cent in the random sample, and the number and per cent in the modal-age group at each grade are shown in Table 8.

[1] "System," as used in this discussion, refers to any group of schools under the jurisdiction of a single superintendent. It includes city, county, and diocesan systems as well as school unions. Thus, the number of communities whose school systems are included is substantially larger than the reported 363.

[2] An exception to the stipulation of 100 per cent testing was made in the case of two very large school systems, in which samples judged representative by the local authorities were used.

TABLE 7. Distribution of Standardization Sample School Systems

Region *	Type of System **					
	1	2	3	4	5	Total
1. New England and Middle Atlantic	25	23	8	3	45	104
2. North Central	7	24	7	3	18	59
3. Southern	15	19	8	—	16	58
4. Pacific Coast	53	34	4	3	25	119
Total	*100*	*100*	*27*	*9*	*104*	*340*

* *Region 1:* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania.
Region 2: Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Missouri, South Dakota, Nebraska.
Region 3: Maryland, Virginia, West Virginia, North Carolina, Georgia, Tennessee, Alabama, Mississippi, Louisiana, Texas, Arkansas, Oklahoma.
Region 4: Montana, Wyoming, Colorado, New Mexico, Idaho, Washington, Oregon, California.

** Type of System: 1 — single municipality with population under 2499
2 — single municipality with population 2500–24,999
3 — single municipality with population 25,000–99,999
4 — single municipality with population 100,000 and over
5 — county, district, union, etc.

TABLE 8. Total Numbers of Pupils Tested, Numbers in Norm Sample, and Numbers and Per Cents in Modal-Age Groups, by Grade

Grade	Tested	In Norm Sample	In Modal-Age Group	
			No.	Per Cent
1	32,129	9,883	7,473	75.6
2	38,305	11,852	8,388	70.8
3	51,576	14,989	10,714	71.5
4	55,246	16,175	11,138	68.9
5	47,434	14,277	9,327	65.3
6	44,892	13,679	8,572	63.0
7	33,352	10,327	6,145	60.0
8	29,742	9,176	5,561	61.0
9	13,060	3,352	2,078	62.0

The random samples of test papers from each class returned for analysis were check-scored, and rescored whenever either systematic scoring errors or random errors of undue magnitude were discovered. The final norms, accordingly, are based on results that are almost entirely free of scoring errors.

Derivation of norms. To derive grade equivalents, both for the modal-age groups and total-grade groups, their respective median scores on the several subtests were obtained for the successive grades, and plotted opposite the grade points 1.8, 2.8, 3.8, etc., to 9.8. In order that a single continuous grade norm line might be plotted covering all batteries, these values were plotted in terms of K-scores (see page 16). Comparability of scores from battery to battery was determined in a separate study of the overlapping between adjacent batteries, results of which were incorporated in the K-score scales to insure proper articulation of results from the several batteries. Curves were then fitted to the plotted points and extrapolated below the values for the lowest grades included in the normative testing and above 9.8, the highest grade tested.

The use of modal-age groups in the establishment of norms was first introduced in the 1940 edition of *Stanford.* The bases underlying the use of modal-age norms have been described at some length by one of the authors and are only briefly indicated here.[1] "Modal-age" pupils may be considered to be those pupils who are at grade for their age. Use of modal-age groups as the norm groups permits a more precise definition of the normative population, since it specifies both the age and grade of the reference

[1] Truman L. Kelley, "Ridge-Route Norms," *Harvard Educational Review;* May, 1940.

groups; moreover, it tends to free the norms of the effects of both retardation and acceleration. The modal-age group for a grade is more precisely defined as the group of pupils in the 12-month age range in which the greatest number of pupils is included. To identify the modal-age group for each grade, the mode of the distribution of ages for the grade was determined mathematically, and a range of six months above and six months below this mode was taken as defining the "modal-age range" for the grade. From the same distributions of chronological ages within grades it was possible to determine so-called "age-grade couplets," which are the associated age and grade values that indicate the typical, or modal, age of pupils of specified grade status. These age-grade couplets are shown in Table 4; they are the bases for assigning age equivalents to scores in the modal-age norm system.

Percentile norms. The percentile norms for end-of-grade testing were derived directly from the distributions of scores for modal-age pupils, and for intermediate points by a process of interpolation between the successive end-of-year results.

Construction

A major goal in the preparation of this edition of *Stanford* was to insure that the content of the test would be in harmony with present objectives, and measure what is actually being taught in today's schools. To make certain that the test content would be valid in this sense, the construction of the new edition (as of each earlier edition) was preceded by a thorough analysis of the most widely used series of elementary textbooks in the various subjects, of a wide variety of courses of study, and of the research literature pertaining to children's concepts, experiences, and vocabulary at successive ages or grades. On the basis of this analysis, the authors prepared detailed outlines of the content to be covered by all subtests at all grade levels. These outlines specified the relative proportion of content to be devoted to the various skills, knowledges, and understandings within each area and served as blueprints for the tests that were ultimately to emerge. At this stage, as well as throughout the whole developmental process, reliance was placed on the judgment of subject-matter specialists in the several areas.

The actual task of preparation of test material was completed early in 1951. Sufficient material was developed for seven experimental forms of each test at each level, each test being of approximately the same length as it was intended that the final form of the test should be. Inasmuch as it was planned that there would be not more than five final forms of the material, this arrangement provided for tryout of about 40 per cent more material than was ultimately to be retained for the final forms of the test. Experimental editions of the seven forms were prepared, these forms being designated Forms T–1, T–2, etc., to T–7. The experimental editions corresponded in page size, layout, typography, etc., as closely as possible to the anticipated final format.

The experimental editions were administered to approximately 12,000 pupils within about a month of the closing of school in spring, 1951. Because of the importance of the decisions with respect to elimination or retention of items that were to be based on results of this tryout, an effort was made to have the tryout sample a representative one with respect to such characteristics as regional distribution, size of school system, and rural *vs.* urban character.

Each coöperating system was asked to list the textbooks in use in each subject, at each grade level. Analysis of these lists of instructional materials indicated that the systems were widely divergent in this respect, which was, of course, desirable from the standpoint of avoiding text-related bias in the sample.

Administration of the tests was done in practically all instances by the classroom teacher, in order that the administration would correspond most nearly to the typical regular administration of the tests. In addition to the experimental edition of *Stanford*, every pupil was given an intelligence test in order that data would be available for checking on the equivalence of ability of the groups taking the several forms (necessary for comparability of item-difficulty values); and for checking on the extent to which the item-analysis sample was a typical one with respect to general ability level. The *Stanford* tests were administered essentially without time limit in order that all pupils would have an opportunity to attempt all items. Provision was also made for the pupils to record in each test the item which they had reached in stipulated amounts of time, which information was used in determining time limits for the final forms of the tests.

In general, the several forms of the experimental editions were distributed sequentially within a classroom (i.e., in the order T–1, T–2, T–3, T–4, T–5, T–6, T–7, T–1, T–2, etc.) so that presumably equivalent groups of pupils took each of the seven forms. This equivalence was, as pointed out above, checked by a comparison of the intelligence test scores for the pupils taking the various forms.

The experimental administration was designed to provide item-analysis information not only for those grades in which a given battery was intended to function in its final form but also for at least one grade below and one grade above this intended range. This was done in order to assist in the selection of items that would discriminate among the pupils at the extremes of the ranges in the regular use of the tests.

For each of the approximately 10,000 questions in the experimental forms, a count was obtained of the number of pupils at each grade level answering the item correctly, and, in the case of multiple-choice items, the number of pupils selecting each of the incorrect responses to the item. The numbers answering correctly were converted to per cents, and these per cents for successive grades for a given item were considered to constitute an "item profile," revealing the extent to which an item correlated with progress through school. These item profiles were considered one of the most important indices of item validity, and considerable weight was attached to them in the selection of items for the final forms. Results of this item tryout permitted identification of ambiguous items, of items either too easy or too difficult for the grades for which they were intended, and of items unsatisfactory in other respects. Such items were eliminated from consideration for retention in the final forms.

Each teacher participating in the administration of the experimental editions was asked for comments, criticisms, or suggestions for improving the tests. Teachers were asked to record systematically on a form provided for the purpose their comments with respect to clarity of questions and directions, appropriateness of content, format, typography, suitability of item types, and other aspects of the test.

The content of the five final forms of the test was selected from the total body of material tried out experimentally in such a way that the final tests conform to the specifications with respect to content, relative emphases, etc., originally established, that they are of appropriate difficulty for the grades in which they are intended to be used, and that they are highly comparable in content and difficulty.